in Single

OXIDES

Color Oxides Smelter Color Compounds Screening Colors Graining Colors Decalcomania Colors Banding Colors

CHEMICALS

nmonium Carbonate atimony Oxide arium Carbonate arium Chloride fertom Section Section

Epson Salts fron Chromate fron Oxides fron Sulphide Red Lead Litharge Magnesium Carbonate Mangamen Dioxide-Nickel Oxide, Black Nickel Sulphate Opas Opas
Potassium Nitrate
Powder Blue
Rutile, Powdered
Sodium Aluminate
Sodium Antimonal
Sodium Silicate
Titanium Dioxide

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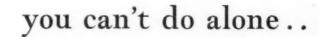
Newspaper headlines are daily pointing to production of household equipment in essential quantities for 1944. For those manufacturers who will be returning to civilian production of essential items, Clyde offers a complete porcelain on steel finishing service.

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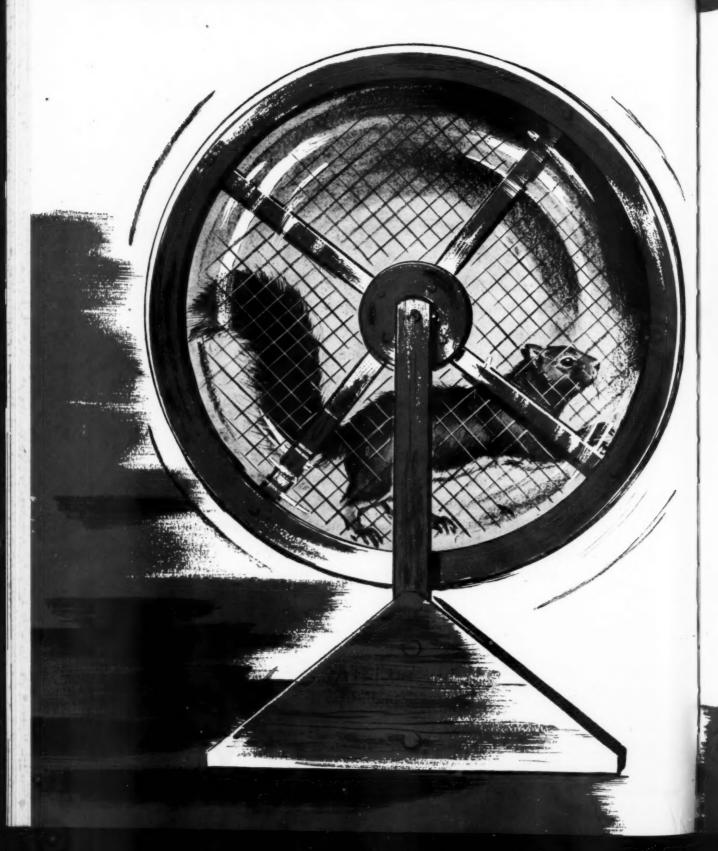
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Squirrela IN A CAGE!

AR ALWAYS DEMANDS that men run, run, run! Sometimes we think we are squirrels in a cage. Stay at home! Work-work-work! That is the command of the day.

And so must it be-but-

Even without pause in our war work, we must look ahead to the day of peace, to the time we can again make porcelainenameled appliances which in turn make life brighter and easier for all.

The day to plan for peace is now. The day to complete those plans, down to the last finish, is now.

What is your post-war finishing problem? Get the counsel and advice of Chicago Vit. engineers and technicians. While Chicago Vit's plant is, and will continue to be, 100% war work, our unequalled laboratory facilities are available today—to work on your finish problems of tomorrow. Get started now. Remember:

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LUSTERLITE Porcelain ENAMELS



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Free-controlled Circulation to those intimately connected with the Ceramic Finishing Industry.

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Jebnuary · March · 1944 Volume 1

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S THE ANSWER

. Do you encounter enameling problems in your own plant? . Are you seeking a job-enameling source?

Is your fabrication department deep in war work? The answer to all these questions may be Ing-Rich.

As you may know, Ing-Rich operates a complete vitreous enameling service. We can offer you our complete line of "Plant-Tested" Porcelfrits and enamel plant supplies. We can handle your job-enameling requirements in our modern factory. We can help you with your fabrication problems in our practical metal fabrication division.

Why not contact us now on your enameling problems? We would be pleased to help.

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INGRAM-RICHARDSON MFG. CO.

of INDIANA, INC.

Offices, Laboratory & Plant . . . Frankfort, Indiana



Why the change in the appearance of finish? — Why no February issue? "The finish line" will endeavor to answer these and other questions which may be in the minds of our readers.

A Great Start

As indicated on this page in the January issue, FINISH got off to a great start with fine editorial support from industry executives and all principal sources of technical information. Advertising support was such that we could be assured of financial stability for 1944, although the "surface had only been scratched" as far as advertising potential was concerned. Since publishing the initial issue of FINISH we have been flooded with communications from executives, technical men, plant executives and enamelers which leave no doubt as to industry acceptance of this new venture.

"Stormy Weather"

It is putting it mildly to say that since the inception of this first independent publication for the porcelain enameling and ceramic finishing industry it has had a stormy career. You have heard the question "What's in a name?" We had many compliments on the name FINISH. One of our good friends said, "It sounds too final." We say now, "It sounds entirely too prophetic."

Paper arrangement

As you will assume, one of the first jobs in planning FINISH was to assure ourselves of an adequate paper supply for 1944. We sought the advice of a printer-publisher who has been operating successfully for some 38 years. After consultation with the management they decided to furnish paper for FINISH from their quota. We quote from their letter dated October 15:

"Please be advised that as per your instructions we have marked out of our present inventory 100-lb. White Enamel Paper (cover stock) for twelve issues of your new publication and enough 80-lb. stock for the first three issues and from then on we will use 70-lb. for the body."

With this assurance we set out to serve the industry in a way we felt would be most effective during the war and reconversion periods, and as a permanent "clearing house" for important industry information.

Double trouble

At the end of the year when consulting with an attorney on matters of taxes, Government forms, etc., we asked that he keep us informed on any new paper regulations. On January 6, as the first issue of FINISH was coming off the press, we were informed that Order L-244, as amended December 30, 1943, prohibited the starting of new magazines. We immediately and voluntarily appealed to the Printing and Publication Division of the War Production Board (January 7) from the provisions of Limitation Order L-244, as amended, offering evidence of good faith in starting the publication

and requesting that we be allowed to continue due to the need in the industry and the evidence of industry support (supported by scores of prepublication letters from executives, and technical and plant men in the industry urging the publication of FINISH and offering complete editorial support) in a letter dated January 11.

A consultant of the Magazine and Periodical Section requested that we "... cease publication immediately" and file a new appeal for relief from the original Order L-244 for the one issue of Finish already printed.

Request issue to relieve advertisers

We had in our offices at that time complete advertising plates for practically all of our contract advertisers which would have been a complete loss if no additional issue of Finish was permitted. We, therefore, wired an appeal that we be allowed to publish a February number pending final decision concerning future issues in order that we might offer relief to our advertisers in this connection. This request was refused by the Administrator of Order L-244 on the basis that we were in violation on the January issue, and a February issue would be a repetition of this violation.

In Washington on January 26 we were informed that the answer of the Appeals Committee of the Printing and Publication Division of W.P.B. was "no paper," but that they would forward the case to the Appeals Board (the W.P.B. Supreme Court) with a recommendation that we be allowed to print a February issue.

Due to the important time element involved the Appeals Board gave preliminary consideration to the case, and advised us on February 5 by phone that we were to be permitted to publish a February number. This is the issue you are now reading as a February-March number. (The paper used was specified by W.P.B. in the interest of paper conservation.)

Case heard by W. P. B.

Our case was presented before the W.P.B. Appeals Board in Washington on February 24. Written evidence from the industry was presented to show: "industry need"—"service and usefulness"—"industry support"— and "facts related to paper usage." (The amount of paper required for 3,500 copies of Finish monthly for one year is the equivalent in tonnage of only one page in one issue of one of the most popular weekly general publications with large circulation.— Under our original arrangement of using paper from a quota already established not one pound of additional paper would be used.— A number of our letters from the field indicate they feel ultimately Finish might result in an actual saving of paper due to the elimination of many independent mailings now required to reach the field.)

Two sides to the story

The case as presented by the Administrator of the Order before the Appeals Board points to the fact that the original Order L-244 prohibits the use of paper in a printer's quota for a "magazine." (It was brought out in the hearing that the paper reserved for us can be used by the same printer to print any kind of advertising material—even "circus posters"—but not to print a technical trade publication such as FINISH.")



There's "Double Value" in Inland Enameling Iron Sheets

E NAMELING iron sheets processed by the Inland method offer two great advantages—exceptional performance in the shop, and finer, more durable finished products.

Inland Enameling Iron Sheets are economical to fabricate, because they are especially made for each customer's job. They are correctly tempered so that finished products are true to design, no matter how difficult the requirements of forming, spinning, corner draws, or extra deep draws. They are uniform, accurate to gage and size, and remarkably free from internal strains, laminations, and surface defects.

Another feature of Inland Enameling Iron Sheets is their special textured surface, imparted by an exclusive patented method. This surface grips porcelain enamel by controlled chemical bond, as well as by mechanical keying. The result is finer and more durably enameled products. This special Inland surface also permits shorter firing time,

or lower firing temperatures. Inland Enameling Iron Sheets are made flat, and they stay flat through successive firings.

There is "double value" in Inland Enameling Iron Sheets—first, in the plant where fabrication and enameling dollars are saved; and second, at the point of sale where finer porcelain enameled products quickly gain the acceptance of new and repeat buyers.

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38 S. Dearborn St., Chicago 3, III.

Sales Offices: Milwaukee • Detroit • St. Paul • St. Louis • Kansas City • Cincinnati • New York

A Wartime heating unit

keeps electric ranges in operation

(plus a conversion story)

By D. B. Kift . VICE PRESIDENT, TUTTLE & KIFT, INC., CHICAGO



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War product manufacturers are familiar with the fact that two metals that have been high up on the list of critical materials

since the early stages of the war are chrome and nickel. Place yourself in the position of a manufacturer of electric heating units for ranges, water heaters and special heating units for a variety of other purposes -consider the fact that most of the essential parts used in these products are normally manufactured of chrome-nickel alloys-then you will see the problem that was presented to our company and, as a matter of fact, to the entire electric range manufacturing industry with the advent of

As far as our company was concerned, since 1937 when it was first organized, our personnel, plant and equipment had been built to offer services in this specialized field. Our services included engineering and council to electric range manufacturers, and the building and supplying of the electric heating units and complex electrical controls.

I have been asked by FINISH to give some details in regard to our conversion to war products and to describe the war-time electric range surface heating unit which was designed to eliminate the highly critical chrome-nickel alloys and still meet service requirements that would provide the many homes using electric ranges with a satisfactory replacement unit. Other heating units were also needed for industrial plants and to keep electrically heated appliances and equipment in operation during the war.

Conversion

While conversion required engineering study and training in the manufacture of complicated products, it was not as serious as it might seem due to the fact that our engineers and complete organization was already keyed to the manufacture of intricate parts and accustomed to precision manufacturing. For instance, one of our peacetime products was the "infinite control", a small, compact, motor-operated control unit designed to give individual and variable control to surface units of electric ranges.

It wasn't too big a "jump" from this type of equipment to the manufacture of radio and other high precision electronic parts for modern war planes. Our engineers and organization were likewise necessarily familiar with heat treating, sheet metal work, and other operations which fit very nicely into the manufacture of some of many important fabricated parts for aircraft assemblies, such as turrets, fuse boxes, auxiliary tanks, pre-heaters, air ducts, etc. Our operations on these parts include both fabricating and assembly.

One major change that required study and training was in the type of materials used. As is now common knowledge, such materials as magnesium and aluminum alloys require an entirely different technique in fabricating and manufacturing processes than that required for other materials more commonly used before the war. It would be inconsistent to pass over the importance of the care and training required by this one factor.

As I mentioned, the personnel of our plant was trained in such a manner that conversion was rather readily achieved. Much of our plant equip-

ment could be used, but it was necessary to increase the floor space and add some new equipment in order to complete the work which we attempted. Our new plant, which we entered in July, 1941, answered the new space problem. Some items of equipment that might be of particular interest to enamelers and sheet metal men are: magnaflux machine, electric salt bath, Sciaky welder, and the Kingsbury machine.

The magnaflux machine is used to test possible fractures in ferro-magnetic metals and welds. Simply described, the operation consists of magnetizing the metal section to be tested, flowing a suitable solution containing iron particles over the surface, and then noting the arrangement of the metal particles. By their arrangement or pattern these iron particles indicate the location of any

The electrically heated salt bath is used in our plant in connection with the heat treating of aluminum and aluminum alloy parts. It is suitable for use with materials whose heat



tle started from "scratch" in

1937, using their past experience in the electric appliance industry to build a company now recognized in both electric and gas appliance fields. As indicated in this article, their activity now consists almost entirely of important war work. (Note the proverbial cigar.)





Top: Testing with Magnaflux machine.

Center: Welding aluminum parts with Sciaky welder.

Bottom: Hydraulic press using "rubber" dies.



treat range is between about 500° and 1200° F.

Broadly speaking the Sciaky welder is designed to give improved results for the welding of aluminum, copper, brass and stainless steel. It employs relatively high energy and short welding time. Introduced in this country during recent years, this type of welding equipment is now widely used for specialized work such as required in the aircraft industry.

As can be seen, in handling a wide variety of war products the degree of skill and general background of training are in closer parallel than might be assumed. We were well pleased with the way our organization swung into this new work, and the results both in production and quality have been very gratifying.

Magnesium was a new material with which we had no previous experience. First operations in handling this material, such as routing, drilling, and tapping, are handled in a separate fireproof building. Later operations and assembly are conducted in our main plant.

Another interesting job has been the production of 8 cu. ft. galleys and refrigerators of stainless steel for P.T. Boats.

Gas valves

The Kingsbury machine (multiple head automatic drill press) referred to is used for production of a new development in gas range valves. The valve is of the rotor type, using two flat surfaces as a seal instead of the conventional tapered seat-this valve has played a valuable part during the war picture due to the minimum use of brass. It is composed of a malleable body, one face of which is finished to a finely ground surface to form one face of the seal. A steel stamped rotor is likewise ground to form the other half of the seal. It is lubricated in the conventional manner.

While this valve has been in use for about three years, present production is confined to manufacture of gas range valves which are designed to be interchangeable with the standard plug type valves as to specifications, assembly and opera-



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cooking requirements. This problem also existed to a lesser degree in connection with water heaters for industrial purposes and special immersion heaters.

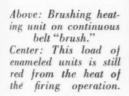
We were enabled to continue manufacturing the standard chrome-nickel units for P.T. Boats, bombers, submarines — and other craft, but this did not answer the housewives' problem. While the mortality rate on electric range burners is very low, some failures do occur, which is the case on any appliance or household product that is used regularly. Therefore, a challenge was presented to the manufacturer of burner units to engineer a war-time burner that would give satisfactory operation and service, and still not call for the use of

We had known for a long time that cold rolled steel tubing could be protected through the use of vitreous enamel. The high temperatures involved in using the burner had formerly made its use impractical because the enamel would become tacky under use conditions, causing failures. Although porcelain enamel could be used quite satisfactorily for all the parts except the actual heating tubes, we had not considered it suitable for protecting this most important part of the burner unit.

New development

A new development in high temperature porcelain enamel protective coating came to our attention through one of the commercial frit manufac-

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FINISHPOTOS.

Below: This photo shows the method of dipping the heating units in the ground coat enamel. Tongs are used for the "dipping and shaking" operation.

tion. Present production on this item is limited due to the lack of the necessary special equipment required for its manufacture.

Porcelain enamel helps

The development problem connected with the production of satisfactory range surface heating units to replace the standard chrome-nickel alloy units was a difficult one. The problem of serving electric range manufacturers with standard units was largely eliminated early in the war by W.P.B. orders curtailing manufacture of the ranges. This did not, however, answer the problem for the thousands of housewives who were depending upon electric ranges for all of their

chrome-nickel alloy or other equally critical materials.

We could see that it would take all the ingenuity of our engineering staff to meet such a request and furnish a burner that would assist in keeping the 3,550,000 electric ranges in daily use throughout the country satisfactorily operating.

Our early engineering activity on this problem called for the use of castings with grooves into which cold rolled steel tubing could be cemented. A burner of this type was developed which was reasonably satisfactory. Tests indicated fairly long life, but operation was extremely slow. No protective coating was used for this type of burner unit.



De-ionized water for War Plants and

the ceramic finishing field

By W. S. Morrison . ILLINOIS WATER TREATMENT CO., ROCKFORD



Most chemical processes require a water equal in quality to that produced by distillation. The chemical and pharmaceutical

industries, when confronted with the need for distilled water, for example, have had to rely upon their supply mechanically produced. However, distilled water in these industries as a source of mineral free water is important in maintaining stability in the product as well as providing color and solution clarity, and in some cases, when the activity of the reagents employed are influenced by the composition of the water, these industries have not hesitated to provide costly steam distilled water in large quantities for their procedures.

To follow the procedure of steam distillation in the ceramic plant, while it is generally agreed that it would be a desirable procedure, has not been the general custom. It is not hard to understand why there is hesitancy about accepting the procedure as the volumes required would be costly to produce. The ceramic engineer is conscious of the unsuitability of some natural waters to his industry, and during the past several years there have been several papers presented on mineral free water for the porcelain enamel plant that have created some interest. These papers, in the past, have pointed out that where a solid content varied in certain natural waters it was necessary to buffer to maintain proper flocculation characteristics of frit and clay.

To study the characteristics of hard water on porcelain enamel finishes at first hand, a private well water that varied in hardness from 16 to 22 grains per gallon was used as the

supply for certain mill additions. The enamel milled with this water was high in set even though the usual setting up agents were held low. During the investigation it was found necessary to age the ground coat the same length of time each day or the water content of the enamel would get out of line. Even with the above described constant aging, it was found that the set would often times break in the dip tank which, of course, necessitated the addition of electrolytes to restore the soluble salts to the ground coat to keep them from being erratic, and it was readily agreed that by adding these reagents we were adding more soluble salts to a ground coat that already contained too high concentrations of spent electrolyte.

To improve this condition a trial run was made using steam distilled water in the ground coat instead of raw water. A definite marked improvement occurred immediately, so much so that distilled water was immediately standardized upon as the water for preparing all ground coats. It was found that the aging times could vary as much as 48 hours without causing erratic water contents in the enamel when it was brought to dipping weight. As was to be expected, a slight increase in the amount of setting up agent was required in the mill formula, but the resultant set was more permanent and subject to fewer variations with changes in temperature. These variations in suspended quantities of clay affect the consistency of the enamel.

During the period of successful operation it was observed that plant operations were demanding large volumes of distilled water. It was suggested that de-ionized water or water freed of its mineral solid content, approaching distilled water in purity, be substituted for the steam distilled water. The discovery of ion exchange resins by Adams and Holmes in 1935 in England had resulted in the development both in this country and in Europe of a process which makes possible the removal of all dissolved salts from natural water without resort to distillation. We who were interested in the resinous exchange development wished to apply the exchange phenomena to the specific problem mentioned above. De-ionizing equipment was therefore installed, and it was found that no difference between the action of distilled water and de-ionized water on the ground coat could be detected. Inasmuch as large volumes of water could be produced for the cost of a few gallons of steam distilled water it was a very economical substitution. Once the large quantities of pure water were available and the plant could economically turn to it as a supply for other purposes it was found that other manufacturing difficulties such as those resulting from the reaction of water impurities on metal during firing could be eliminated. This plant has had no difficulty with copper heading which is a reaction often attributed to the sulphate content in hard water.

When the economics of de-ionizing equipment were investigated and when it was found that rejects in the enamel room were greatly reduced, it was suggested that proper equipment be installed to purify the water for porcelain enamel purposes. This proved to be an economical move and one which the porcelain enamel industry very likely will come to in time, so a discussion of the exchange materials, how they are housed, their reactions and some further applications are herewith presented.

When in 1935 the two English in-

vestigators, Adams and Holmes, announced the base exchange principle of certain resins they had essentially polymerized a polyhydric phenol-formaldehyde resin to its insoluble C stage. These resins were base exchangers because they had a tendency to exchange their sodium or hydrogen ions for calcium and magnesium. To appreciate the significance of the statement "to exchange sodium or hydrogen ions", it is best to recall that many well known sodium alumino silicates such as greensand or synthetic . gel ezeolites, when prepared commercially, were suitable structures in exchanging the sodium ion for other cations when in contact with inorganic salt solutions. The exchange of sodium for calcium is the basis of the zeolite sodium exchange principle and had been the accepted zeolitic method to soften water before the Adams & Holmes investigations.

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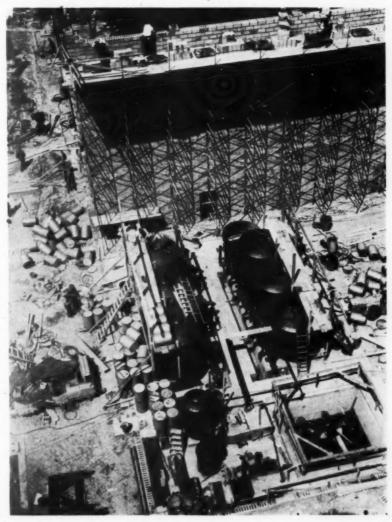
The removal of calcium and magnesium ions from water is governed by the law of mass action, and the reaction is reversed when an excess of sodium chloride is administered to the zeolite bed, and this, of course, is the basis of the regeneration cycle of the familiar and widely used zeolite beds employed in industrial practice. These sodium alumino silicates are influenced to a large degree by the type of cation they exchange as certain mechanical strains imposed upon their structure lead to their deterioration. It is true, too, that solutions high in pH or low in silica content are destructive to the life of the zeolite. Regardless of these limitations sodium zeolite has been adapted to a number of commercial enterprises and is still the basis of commercial work when water containing sodium concentrations equivalent to hardness producing ions in the raw water can be utilized.

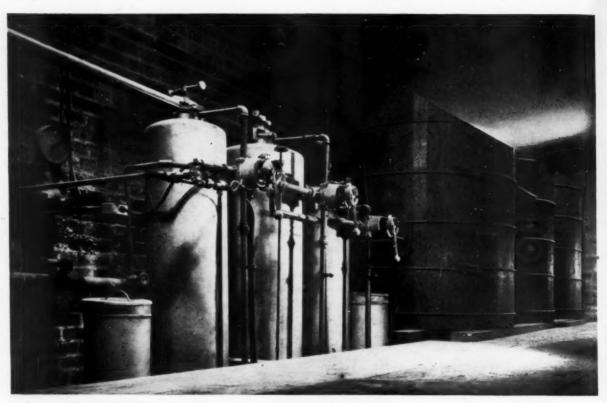
The installation for early work with hydrogen exchangers was to combat the efficiency of the alumino silicates and to permit the exchange of the hydrogen ion for all cations. Even before Adams and Holmes some materials had been prepared by sulfonating organic compounds such as wood and lignite. These materials were called carbonaceous zeolites and it

was found that they could be regenerated with sodium chloride to be sodium exchangers, or with dilute mineral acids to become hydrogen exchangers when on the so-called "hydrogen cycle". In the hydrogen cycle, then, it was soon illustrated that the passing of inorganic salt solutions through the exchangers converted these salts to their corresponding acids. Bicarbonate salts, for example, were converted to carbonic acid, and the salts of chlorides and sulphates to their corresponding mineral acidity. Adams & Holmes showed that a resin containing active hydrogen groups released these active ions for complete exchange of the cations of dissolved salts in water and that these exchange reactions actually did take place when the water containing salts were passed over a column of particles of the resins. Soon it was demonstrated that high capacities of the resinous cation exchangers could be prepared if into the nucleus of the resin the investigator incorporated methylene sulfonic acid groups. The resultant resinous exchangers were able to undergo regeneration with either salt or acid and entered into all the previous reactions discussed with much higher capacity.

Once the complete acid conversion was realized, it was a short step for the early investigators to experiment with a resin capable of adsorbing the acids from the first reaction. Adams and Holmes in their work were able to formulate an amino formaldehyde resin that could undergo acid adsorption. This reaction is somewhat simi-

500 gallon per minute units being installed in a large Ohio chemical plant.





This represents a typical unit as covered in Mr. Morrison's article. It is a water treating unit installed by Chicago Vitreous Enamel Product Co. as a part of a complete clay refining plant.

lar to the formation of amine salts such as might take place between ammonia and hydrochloric acid. The acids on the amine resin were found to be fixed molecularly and bound reversably so that when the resin had adsorbed its capacity for acid it could be removed and returned to its active state by regeneration with a dilute alkali such as sodium carbonate.

A summary of these reactions is best described in the equations listed below. Here the possible reactions of the resinous ion exchangers are presented.

Sodium Exchange:

 $\begin{array}{l} CaCO_8 + Na_2R = CaR + Na_2CO_8 \\ CaSO_4 + Na_2R = CaR + Na_2SO_4 \end{array}$

 $\begin{array}{l} Hydrogen \;\; Exchange: \\ Ca\left(HCO_3\right)_3 + 2\; HR = CaR_3 + H_2CO_3 \\ CaSO_4 + 2\; HR = CaR_3 + H_3SO_4 \\ CaCl_3 + 2\; HR = CaR_3 + 2\; HCl \end{array}$

Acid Adsorption:

2 RX + H₂SO₄ = (RX)₂. H₂SO₄
RX + HCl = RX . HCl
(X being acid binding substance)

When these basic reactions were formulated it was obvious that the reactions of the hydrogen resins and the acid adsorbing resins could be combined to give a cation-free and neutral effluent. Water treated with the hydrogen form of the cation exchanger and the acids that were formed from the soluble salts present in the raw water are adsorbed in the anionic adsorber, leaving a water which is comparable, and often superior, to distilled water. It was this water, then, that was employed in the enamel plant where the substitution of the de-ionized water was made for distilled water.

During the war, while the activity in the porcelain enamel industry has decreased there has been an understandable lack of advancement in the studies of the reaction of pure water with colloidal clays. This activity is unquestionably going to increase soon so a discussion will follow on how the resins are housed to perform the various reactions and how they have been adapted to certain industries during the War.

The resins are normally housed in vertical cylindrical pressure tanks. To insure the water being treated passing uniformly through the bed so that all parts of the resin are utilized equally, water is introduced at the top of the tank and collected at the bottom by a system of piping called distributors. To prevent the loss of resin through the lower distributor and to aid in the equal flow of the water through the bed, the resins are supported by several layers of pure quartz gravel ranging from coarse at the bottom to fine at the top.

In addition to the tank, provision is made for water connections at top and bottom and for controlling the flow of water as well as an injection system for regenerant solution. This may be done with a series of individual valves, by the same valves remote controlled from a central location, or more usually, by a single multiport valve which in itself controls the phases of regeneration. Naturally, the tanks themselves, the distributors, piping and valves must all be resistant to the corrosive action of the dilute acids encountered, not only to prevent destruction of the equipment but to protect the purity

of the treated water. Freedom from corrosion is obtained by fabricating of materials inherently resistant to the acids or by lining steel with acid proof materials such as plastic or rubber.

In addition to the actual reactor tanks there must be suitable tanks for holding the proper regenerant solutions and methods of introducing them into the resin beds in the proper concentrations. The latter may be done by pumping or by the use of a hydraulic ejector. Minimum mechanical requirements for the production of pure de-ionized water also include meters for measuring the quantity of water treated as well as its purity. In some cases means must be provided for dispelling CO: and hence raising the pH. Where large volumes of water are required intermittently, a storage tank and pump eliminates the need of much larger equipment.

Storage tanks are essential in those installations requiring 24 hour a day production, to carry-over the regeneration period, or the entire equip-

ment built in duplicate so that one set of tanks is operated while the other is down for regeneration.

Where the raw water contains appreciable magnesium, a sodium zeolite water softener is provided to supply magnesium-free water for making up soda ash solutions as well as providing softened water for the actual regeneration of the acid adsorbing resin. This is done to eliminate the precipitation of Mg(OH): on the bed, lengthening the rinse period of regeneration. Water from the cationic exchanger could be used but the use of the softener permits the exchanger to be regenerated at the same time and also eliminates the use of some of the capacity of the cation exchanger.

The capacity of the equipment is a function of the amount of resin in the tanks with an inherent capacity for each cubic foot, and the concentration of solids in the water being treated. Thus, a given amount of resin may have a capacity on a certain water to treat 10,000 gallons be-

fore it is regenerated and on a water containing 1/10 the solids it will treat 100,000 gallons between regenerations. The length of time between regenerations will-depend, of course, upon the rate the 10 or 100,000 gallons are used.

The following are a few installations which have been taken at random to illustrate the economy as well as the applications which several industries have found for de-ionized water:

One is a pharmaceutical house. It consists of a plastic lined steel tank 54" in diameter by 84" for using 64 cubic feet of cation exchanger. The anionic unit is 30" in diameter by 72" and contains 12 cubic feet of anionic adsorber. The cationic removal unit is guaranteed to produce 65,000 gallons of treated water hetween regenerations. The plant operates at a rate of 1,000 gallons per hour and is guaranteed to produce water having a total salt content of ten or less parts per million. This is

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Plastic lined cationic and anionic reactor tanks in a pharmaceutical house. The cationic removal unit is guaranteed to produce 65,000 gallon of treated water between regenerations. The plant operates at a rate of 1,000 gallons per hour.



All-porcelain hospital awaits war's end for completion

By Elsa Gidlow . WEST COAST CORRESPONDENT



One of the largest, possibly the largest porcelain enamel construction jobs ever to be undertaken stands uncompleted in Cali-

fornia's Grass Valley awaiting the end of the war so that the ambitious project may be finished. It is the all-porcelain Grass Valley Memorial Hospital which is being donated to the city of Grass Valley by Mr. Errol MacBoyle, vice president of the Idaho-Maryland Mining Corporation. All of the exterior work on the building was done when war and its priorities halted construction a year and a half ago and caused postponement of the architect's plans to make this the first hospital to be entirely finished with porcelain enamel, both inside and out. But even as far as it has gone, it is a fascinating and challenging job, and the ultimate plans will be exciting to everyone who is interested in the structural uses of porcelain and the solutions of the problems it presents on a large scale.

The Grass Valley Hospital was first projected in 1940, to cost about

\$350,000 and to cover an irregular area of some 200 x 325 feet. It was to have an initial capacity of 125 beds, to be ultra-modern in design, to be arranged to make the maximum therapeutic uses of sunlight, and to present, inside and out, the bacteriaresistant surfaces of enduring and washable porcelain enamel. It sounds like a hospital worker's dream. But it came to pass.

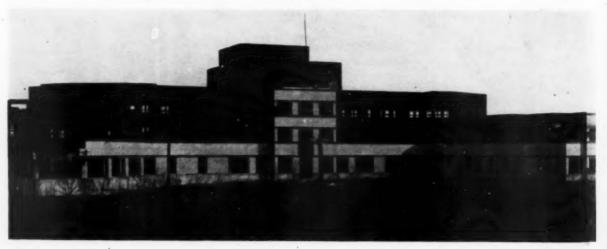
Surviving the vicissitudes of war's earlier stages — manpower and material shortages — the project, scheduled for completion in the spring of 1941, limped along over a far longer construction period and in 1942 came to a halt with all of the exterior work done and, in fact, everything except the porcelain enamel finishing of the interior walls.

As it stands, the hospital is an allsteel building with the wall and floor structural members built of cellular steel. Architect-in-charge, Walter C. Clifford, now in the Services overseas, discussing the original plans several years ago with the writer, said that the use of this material in connection with the hospital plans "created a new type of construction and presented many new problems." Most of these centered about the application of the porcelain enamel material, since this is a job involving steel-to-steel connections, with no wood stripping. The porcelain panels were flanged with self-flashing joints and were insulated by laminating on the interior with insulating board 3/4 inches thick cemented to the back of the enameled sheet. The panels were applied directly to the steel walls by means of special patented clips secured by metal thread cutting screws.

The outside of the hospital covered with the porcelain enameled panels represents an area of approximately 63,000 square feet. The steel sheets, 18 gauge, were supplied by the Columbia Steel Company, U. S. Steel Corporation Western subsidiary, to the Ferro-Enameling Company of Oakland, California, with the Frank Allen Company as contractors. All of the exterior walls, and also the inside surfaces of the parapet walls of the solarium balconies, are covered with the porcelain panels.

The design of the Grass Valley Hospital is interesting. One of its outstanding architectural features, of

General view of hospital partially completed shows how the rooms and balconies are staggered on the wings.



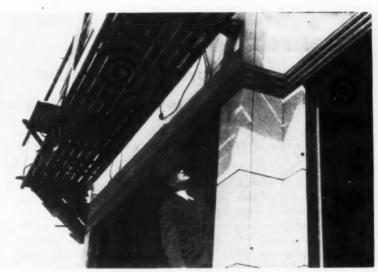
course, is its total steel construction, including flooring, and the extensive use of porcelain. Also unusual is that all rooms are outside rooms and have direct sunlight at some time of day. The rooms are so planned that each one connects with a balcony, and patients may be taken out into the sunlight and fresh air directly from the room. This is made possible by the way the floors are tiered, providing for a solarium balcony with parapet walls outside each private room. The large French doors opening onto the balconies permit the whole bed to be rolled out if desired.

The building towers run up to five stories, with set-backs to allow maximum window space and catch all available sunlight.

In a climate of strong light such as California, a hard, bright surface would be painful to the eyes. To overcome this difficulty, the surface of the building was rendered low in reflectance by the use of mottled flat matte in pale buff, with matte finished maroon, reeded bands for trim. The color and surface thus attained gives a resemblance to terra cotta and harmonizes attractively with California's sunburned countryside. The elimination of glare was another of the problems thus overcome.

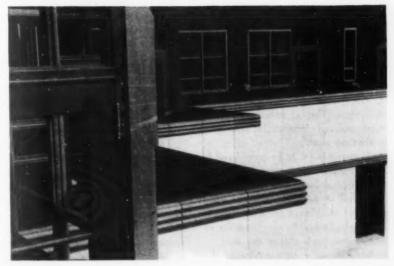
When the exigencies of war made necessary the suspending of construction, the builder was considering the use of porcelain enamel panels for the total wall surface in the operating rooms and porcelain enamel wainscotting panels throughout the balance of the hospital, including isolation wards and special treatment rooms. The use of radiant heating was also being given consideration, with the tentative plan of concealing the heating coils in the ceilings. Now the completion of these plans await the availability of materials and labor.

Architect Clifford was, and doubtless still is, an enthusiast for porcelain enamel in construction. Before choosing the material for this hospital, the building and landscaping plans of which were under his direction, he made a thorough study of materials. He did not specify porce-



Top: Walter C. Clifford, San Francisco architect who designed hospital, inspects the job. — Center: Shows workman driving self-thread cutting screws used to attach "pans" to steel wall. — Bottom: Close-up of solarium balconies of Grass Valley Hospital.





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Research paints a picture of the future

A study of building and plumbing ware potentials

By R. A. Dadisman . AMERICAN ROLLING MILL CO., MIDDLETOWN, OHIO

IN A STUDY of general business conditions as they may be projected to the post-war period it seems in order to consider conditions following previous wars. The widespread impression that former wars have always resulted in prompt collapse and stagnation is not correct. The Brookings Institution (a prominent research organization), in several studies, has pointed out that post-war patterns in the past have been about as follows: First a few months of hesitancy, followed by a year or more of active business - then a relatively short period of trade and financial readjustment, with a succeeding period of prosperity extending over several years.

You will remember that a building boom followed the last war, and lasted for six years - then continued another four years at a comparatively high rate.

A pattern for the future

There are a number of important current developments which are shaping a pattern of the future. First is the backlog of buying power - in the form of a gigantic pool of war stimulated savings. There was, at the end of 1943, 60 billions of savings in highly liquid form - currency, bank deposits and Government bonds. It is considered probable that it will be 100 billions by the end of this year. This is greater than the total national income for any one peace-time year.

A second point to be considered is the reduction of consumer debt. This noticeable reduction is from a prewar level of 9.4 billions to the present level of about 4 billions. This is extremely favorable to expansion of installment buying after the war.

A third point to consider is the

accumulation of nearly 30 billions of dollars in business savings, and

The fourth point, and one that has received widespread editorial comment, is the deferred demand for goods. This is evident in literally hundreds of products, but our interest in connection with formed metal plumbing ware is naturally in the field of construction.

Outlook for construction

Let us first take a look at the prospects for new residential construction. As can be imagined, there are a great variety of estimates. For example:

Crane survey - This study indicates that 56% of the families expect to build a home after the war! This would mean 18 million homes! There is no limit specified in connection with these figures.

U. S. Chamber of Commerce survey - This is a third report from this source and shows that 1,540,000 families say they intend to build or buy a new home within six months after the war is over. Two earlier surveys showed: in the first, that 900,000 families indicated such intent; and in the second survey that 1,015,000 had so indicated. The trend is obvious.

National Association of Manufacturers - shows 1,012,000 dwelling units annually for 3 years after the

The Fortune survey - shows that 13% of the families will buy or build a home after the war. This would mean approximately 4,680,000 homes. Again, no time limit was placed on the question.

F. W. Dodge - This well-known source of information on projected building indicates 820,000 dwelling units to be the annual average for the first post-war decade.

Our own estimates, based on the relationship of dwelling unit construction to national income, show the possibility of 900,000 to 950,000 units annually for each of several years after the war, if the national income is around 100 billions of dollars (in 1940 prices).

This is roughly equal to the 1925 construction peak of 937,000 units and 50% to 58% over 1940's 603,-000 units.

Hotel construction

Specific data are not available at the moment for the post-war possibilities in the hotel construction field. It seems obvious that if high levels of national income prevail in the vears after the war, there will be a sizable program of hotel building and modernization.

Normal growth in the hotel industry, a backlog of demand for items restricted by the war program and competition are all factors lending support to this opinion.

Another factor that will figure in

R. A. Dadisman

Mr. Dadisman is manager of the Marketing Development

Division of The American Rolling Mill Company and chairman of the P.E.I. Market Development Program. He has made an extensive study of potential markets for porcelain enameled steel products. This article is based on a talk before the Formed Metal Plumbing Ware Assn. in Cleveland, Feb-

ruary 11.



this expansion is the expected increase in travel, and other leisure time expenditures in the post-war period. This will call for more and better hotels, tourist camps and other housing for transients.

Residential maintenance and modernization

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Naturally, we are all interested in that part of expenditures for maintenance, modernization and repair which deals with the plumbing industry. Some interesting observations can be made from the third Chamber of Commerce survey mentioned previously.

The survey shows that 39% of home owners intend to make repairs, improvements, and additions to their properties within six months after the war ends. Of these, 528,000 plan to add new bathrooms and 320,000 plan to renovate present bathrooms.

If we assume that the intention to renovate means a new set (or partial set) of fixtures, then there is a potential demand for 848,000 bathrooms—among present houseowners who plan to improve their property.

Further — among property owners there are intentions to make improvements in rented homes. 1% say they will add new bathrooms; another 1% say they will renovate bathrooms. Since there are about 20,000,000 tenant-occupied dwellings in the country, such plans would mean another 400,000 bathrooms.

Total outlook for bathrooms

Let us see what this all adds up to. First we have a total of 925,000 bathrooms for new homes; second, 848,000 bathrooms for homeowners improvement programs; and third a 400,000 total for tenant-occupied dwellings. This results in a figure of 2,173,000 as a grand total.

Another way of analyzing this demand would be to separate the potential which represents backlog demand, and that which would be represented by demand through new construction. Here we have a 1,248,000 figure for backlog demand and a 925,000 figure for new construction demand.

These figures give some idea of

what may be in store for bathroom fixtures, based on our own estimates of new home construction and on the Chamber of Commerce survey for modernization.

Specific plumbing items

Our Market Research Department has also made some post-war estimates for specific plumbing items, based on correlation analyses between the products and net national income.

At a 100 billion dollar level of national income (1940 prices) and with construction of about 925,000 dwelling units, the possibilities for production of plumbing fixtures looks something like this:

Bathtubs—1.260,000 to 1.420.000 Lavatories—1,600,000 to 1,800,-000

Sinks-2,250,000 to 2,500,000

Please bear in mind that these figures do not make any allowance for backlog demand accumulating during war years.

Taking the mid-point between each set of the figures just given we find that the estimated production in the post-war period would compare as follows with 1940:

Bathtubs—40% over 1940 Lavatories—35% over 1940 Sinks—45% over 1940

Ultimate possibilities

Another factor not taken into account in the foregoing estimates is the possibility of acceleration in bringing the country's entire stock of homes up to a state of good repair. Such acceleration may be brought about after the war if the Nation achieves and maintains a high level of national income.

The possibilities for plumbing fixtures in such an eventuality are enormous. These possibilities are illustrated by the 1940 Census of Housing which show that only 56.2% of the total dwelling units in the United States have bath or shower for exclusive use. An additional 4.7% have bath or showers which are shared. This leaves a total of 39.1% of the total dwelling units that are not provided with either tub or shower.

This may be broken down to show the following:

Urban 15.2% no Baths Rural Non-farm 57.3% no Baths Rural Farm 88.0% no Baths

We find in a further study of the Census of the 6,414,000 dwelling units needing major repairs in 1940, 5,033,000 (or 78%) did not have a private bath and flush toilet. Further, of the 28,613,000 dwelling units that did not need major repairs in 1940, 10,819,000 (or 38%) did not have a private bath and flush toilet.

An admonition

The analysis that I have given you presents quite a rosy picture, but let us acknowledge the fact that all this is not in any sense automatically assured. I would like to further emphasize that this represents a study of potentials—not a tabulation of automatic demand.

Notice that our own estimates were predicated on a post-war national income of 100 billions of 1940 dollars. And it is safe to assume that any expressions of intentions to build or remodel made by the general public carry the implied provision that they will have the jobs and wages sufficient to give them the confidence to carry out their present intentions.

In other words, before we can realize the potentials that have been indicated for the plumbing fixture business, our country must solve the problem of maintaining a level of employment after the war that is 20% over the level of 1940, and productivity of goods and services, 40% over that year.

Our most difficult hurdle in reaching this goal will be to solve the complicated problem of expanding civilian output as war production is curtailed. This is a problem that will require fullest possible cooperation of Government, Business, Labor and 'Agriculture.

It is encouraging to see that the formed metal plumbing ware industry recognizes the responsibility to plan now, so that when the opportunity comes for resumption of fixture production it can be accomplished with the least possible delay and confusion.



PEOPLE YOU KNOW



J.F. HUNT — As new Gen. Mgr. of Orefraction, Inc., Pittsburgh, "Jack" retains his interest in ceramics. The company imports and refines minerals for the ceramic, metallurgical and chemical industries. "Jack" made many friends in the enameling industry while field development engineer for Titanium Alloy Mfg. Co.

w, Pres.





OR SHOULD KNOW

Strictly Candid

C. S. PEARCE — "Charlie" should certainly need no introduction to enamelers. As Managing Director of the Porcelain Enamel lastitute he has for the past several years been responsible for administrating the porcelain enameling industry's cooperative organization.





E. L. SEASHOLTZ — One of the three brothers operating an old and well estilished enameling plant in Reading, Pa. — J. M. Seasholtz & Sons, Inc. "Ed" Gen. Mgr., and brothers Paul and Ralph operate the plant. They have be specializing in industrial applications for porcelain enamel during the w

press talk



BIG PRESS-"I certainly wish I could stamp out some table tops again."

LITTLE PRESS—"Pipe down, Big Press. You will be making tops again—what is your kick? Weren't you busy last month on stamping out things that Uncle Sam needed BADLY?"

BIG PRESS—"Sure I did, but I would rather make table tops. That is my business. It is more fun."

LITTLE PRESS—"You've got a war to win, big fellow. So long as we NEED anything for victory, you make it. Never mind what you want to do. Mrs. Jones would rather her son has everything he needs than to have a new table for her kitchen."

Our press room is operating every day. It is ready to stamp out any parts for porcelain enameling that are needed to help win the war.

When that job is done, we will be making table tops, breakfast sets, and all sorts of parts for peace-time living.

VITREOUS STEEL PRODUCTS CO.

BOX 1791, CLEVELAND 5, OHIO (Factory at Nappanee, Ind.)

From the Editor's mail

From the flood of communications that have been received by finish we are printing brief excerpts from some of those which have a bearing on need, service and usefulness, industry support, etc., for this first independent publication devoted exclusively to the industry:

INDUSTRY NEED

Acme Wiley Corporation, Chicago, Illinois.
"Excellent magazine. Has been needed for the last ten years by the industry."
Ralph Weber, Plant Superintendent

W. A. Barrows Porcelain Enamel Co., Cincinnati, Ohio. We have had the opportunity of examining the Jannary issue and feel certain that the publication meets a very definite need."

W. A. Barrews, President. very definite need."

Caleric Gas Stove Works, Topton, Penns

"There is no question in my mind that the need for such an independent publication has been sorely felt by the industry for a great many years. . . . "

N. R. Klein, Manager

The Chattanooga Stamping & Enameling Company,

Chattanooga, Tenn.

"You are to be enthusiastically congratulated, first for the conception of the idea that fills a long felt want; . . for the quality of the presentation and editorial matter...."

H. D. Thompson, Manager Sales and Service.

Clyde Porcelain Steel Corporation, Clyde, Ohio.
"There is no doubt that the porcelain enamel and appliance industries need an independently published

T. E. Stokes, Executive Vice President.

Cribben and Sexten Company, Chicago, Illinois.
"It seems to me that this magazine will be just the necessary thing to fill the now very apparent vacancy C. E. Lyon, Vice President.

The Erie Enameling Company, Erie, Penna.

"I have read with great interest your new magazine finish and want to congratulate you on filling a very real need for the porcelain enameling industry."

H. E. Schabacker, President.

ingersoil Steel & Disc Division, Borg-Warner Corp.,

"I believe there is a need for such a publication, as I do not know of any in the field at this time.

S. L. Ingersoll, Vice President.

Mullins Manufacturing Corporation, Salem, Ohi

"There certainly is a definite need for such a publication that will cover technical as well as ordinary shop problems."

O. L. Earl, General Sales Manager.

Murray Corporation, Detroit, Michigan.

"Finish will fill a long felt want for an unbiased trade magazine."

E. G. Aydelett, Ceramic Engineer.

Newark Stove Company, Newark, Ohio.
"This magazine is something the industry has needed for some time

Robert D. Evans, Enamel Superintendent.

Pemce Corporation, Baltimore, Md.

"We need such a publication as you have given us, and it has all my best wishes for the future." Richard H. Turk, Executive Vice President.

Servel, Inc., Evansville, Indiana.

"A publication of this nature has long been needed for the betterment of the porcelain enamel industry."

H. P. Juncker, Foreman

A. O. Smith Corporation, Milwaukee, Wisconsin

"The January issue is excellent. . . . We believe it fulfills a definite need in the porcelain enamel industry."

Waldo W. Higgins, Director of Ceramic Research & Development.

Standard Gas Equipment Corporation, Baltimore, Md.
"I sincerely believe there is room for a publication of this kind devoted entirely to the porcelain enamel industry and giving us both the shop and technical side of

J. D. Taylor, Jr., Supt. Commercial Dept.

Strong Manufacturing Company, Sobring, Ohio.

"A definite void in our industry has been filled."

Walter H. Welf, Ceramic Engineer.

U. S. Porcelain Enamel Co., Los Angeles, California. "Fills a long felt need." J. L. Hedgkinson, Partner.

The Wayne Pump Company, Fort Wayne, Indiana. "There is a real need for such a publication."

Alfred O. Schell, General Foreman.

SERVICE AND USEFULNESS

California Metal Enameling Co., Los Angeles, Cal.

"I think there is a definite place for such an inde-endent publication." J. T. Penten, President. pendent publication.

Consolidated Vultee Aircraft Corp., San Diego, Cal. "I just finished reading your first issue of finish I found it highly informative and extremely interest-I am sure it would be of great benefit to me in my work as Engineering Representative. The problem of ceramic finishes arises frequently in the course of my duties.

John F. Hogan, Engineering Representative, Tooling & Methods Department.

Ferre Enamel Corporation, Cleveland, Ohio.

'After several discussions with our staff, we are unanimously agreed that your idea of producing a new trade magazine, devoted exclusively to porcelain enamel, is an excellent idea, and should be of great benefit to the industry."

R. A. Wesver, President.

Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.
"I have just finished your finish magazine and I believe this will be a great help to me. Many thanks."
Rebert G. Griffin, Supt. of Enamel Dept.

Midwest Mfg. Company, Galesburg, Illinois.
"This is certainly a fine start and I have often won dered why an independent porcelain publication wasn't on the market."

J. C. Battles, Asst. to President.

Motor Wheel Corp., Due-Therm Div., Lansing, Mich. We are in receipt of your first issue of finish and "We are in receipt of your indicates find the contents very absorbing."

D. F. Jenes, Chief Engineer.

New Monarch Machine & Stamping Co., Des Moines, Ia. We believe it is edited by a man who understands his business, and with the valuable information he will put out to the trade, we believe he could save tons of steel and tons of frit, which is used in Porcelain Enameling."

C. S. Anderson, Vice Pres. & Sales Manager.

The Ohie State University, Columbus, Ohio.

"Finish will be an important instrument in the corre-lation of the research work in the ceramic departments of the universities with the needs of the industries se the results of this research work. which t

R. M. King, Associate Prof., Ceramic Engineering. The Prizer-Painter Stove Works, Reading, Penna.

'A publication of this kind should prove of great assistance to the management and employees in the Enameling field." L. E. Bilger, Superintendent.

Renown Stove Company, Owosso, Michigan.
"It has been our belief that much good can be accomplished by publication of technical articles related to the finishing field and in our case in particular, in con-nection with the problems incidental to the porcelain enameling industry." B. A. Nagelvoort, President. B. A. Napelvoort, President.

Republic Aviation Corp., Farmingdale, N. Y.
"Excellent addition to finishing industry."
Philip Spigel, Production Research Eng.

Revere Copper & Brass, Rome, N. Y.
"First issue of finish is excellent and a fin for future issues." J. T. Irwin

Gee. D. Reper Corporation, Rockford, Illinois.

"We have hopes that finish will act as a meeting place for the best minds in the industry and that through an exchange of ideas mutual benefits will accrue."

E. H. Shands, Ceramic Engineer.

Standard Oli Company of California, San Francisco, Cal.

"Am hoping that enamels will be made more suitable for corcosion protection in chemical processes, and articles on corrosion protection by enamels will be of interest."

K. V. King, Materials Engineer.

Sunboam Electric Mfg. Co., Evansville, Indiana.

"An excellent publication. It should help the porce lain enamel industry a lot." Allen E. Apple, Wartime Labor Relations Supervisor.

University of Illinois, Department of Ceramic Engineering, Urbana, Illinois.

"I feel that this magazine is one of the most promis-ing means by which the Enamel Industry would be brought together and thereby be encouraged to work together on many of the problems which are so closely

related to the war effort.

A. i. Andrews, Professor, Head of the Dept.

Seeger Refrigerator Company, St. Paul, Minnesota.

"If there is anything that we can do to contribute toward the success of your venture, in the way of supplying practical shop information or technical data, do not hesitate to call upon us to do so."

N. H. Griebenow, Works Manager.

Servel, inc., Evansville, Indiana.
"It has been my good fortune to discuss the first issue of finish with several practical enamelers and they were of ninsh with several practical calculations of the very much impressed with your first issue. It seems to be the journal that the industry has long been waiting for."

Sam L. Nichelsen, Buyer. ing for

Westinghouse Electric & Manufacturing Comp Cleveland, Ohio.

"I am very much in sympathy with the idea of you publishing a magazine exclusively to the Ceramic Finishing Field." **B. F. Yardley**, Section Engineer, Materials, Process, Stds., & Labs

Welverine Percelain Enameling Co., Detroit, Michigan. "Please enter our subscription for finish as we feel this publication has a definite position in the industry. E. Dwyer, President.

National Bureau of Standards, Washington, D. C.

"We have been pleased at the prospect of an inde-endent publication devoted exclusively to ceramic finishes on metal.

W. N. Harrison, Chief Enameled Metals Section.

Vitreous Steel Products Co., Nappanee, Indiana. "No one would question the desirability of having such a source of information in normal times, but it is my opinion that it will be even more helpful to many of our operating companies in connection with our war-time activity, and particularly during the reconversion period."

H. B. Gray, Vice President.

Westinghouse E Mansfield, Ohio. use Electric & Manufacturing Company.,

"I read your first issue of finish with great interest.

I believe it is the finest magazine covering ceramic problems that I have ever read."

R. F. Bisbee, Manager Quality Control.

INDUSTRY SUPPORT

The Alliance Percelain Products Co., Alliance, Ohio. "I am sure that you can count on the support of the industry as a whole and of its individual unita."

W. H. Brett, Vice President.

The American Relling Mill Co., Middletown, Ohio "You can count on the full support of ARMCO's Research Laboratories in the new publication finish." Anson Hayes, Director, Research Laboratories.

Benjamin Electric Mfg. Company, Des Plaines, Illinois. "Naturally we are interested in this new project and assure you of our cooperation.

D. S. Hazen, Vice President. Chleage Vitreeus Enamel Product Ce., Cicero, Illinois. "... we agree to take a double-page spread in each issue of finish for the period of one year. Further than this, we want you to feel free to call on our technical

division for any assistance you may require."

Wm. Hogenson, President.

Ingram-Richardson Mfg. Company of Indiana, Inc., Frankfort, Indiana.

"The writer firmly believes a publication such as this is badly needed in our industry. For this reason we want to give you all the support we can.

R. H. Coin, President.

Newark Stove Company, Newark, Ohio.
"The leading companies should cooperate with you in every way possible both from the personal and tech-nical standpoint." F. H. Guthrie, Vice President.

Porcelain Metals Corporation, Louisville, Ky.

"...Mr. McBride and I have discussed the venture
which you are entering. We jointly are extremely
appreciative of your enthusiasm and interest in the
industry..."

B. F. Birdwell.

Percelain Metal Products Co. of Pittsburgh

Carnegie, Penna.

u have made a grand start and . . . I pledge to do everything possible to help keep it going and cooperate to give our technical assistance to you, that all may benefit by developments that are created in our or ganization." Milton Gallup, President

Reberts & Mander Stove Company, Hatboro, Pa.

"Our company and the writer are very much in favor of finish. I believe . . . it . . . will broaden the minds of porcelain enamelers all over the country on technical." information, shop practice, methods of application, etc."

E. H. Adams, Enameling Supt.



Howard Myers

Mr. Myers has been with THE ARCHI-TECTURAL FORUM since 1919; since 1925 as its Editor and Publisher. He is Chairman, Architectural Advisory Committee of the Federal Public Housing Authority; Governor, New York Building Congress; Member of the Architectural League of New York; Society of Beaux-Arts Architects.

PHOTO BY KATHERINE YOUNG

"When are you and building going to get together?"

By Howard Myers · EDITOR, THE ARCHITECTURAL FORUM



Porcelain enamel is still an architectural oddity rather than a generally accepted, widely used building material.

The chief reasons for this are several, and fairly obvious. Not in any special order of importance, here they are:

The attitude of the porcelain enamel industry shows little outward evidence of interest in the building field beyond one or two conventional uses, such as store fronts and gasoline service stations. Whether this attitude stems from an inferiority complex or from genuine lack of faith in porcelain enamel's possibilities in buildings or simply from inertia is something the readers of FINISH can judge better than I. A second and longstanding barrier has been the lack of uniform standards of manufacture and installation practice. A third and rapidly disappearing difficulty has been until in recent years the public's devotion to period architecture in which porcelain enamel could be introduced only in an incidental way, if at all.

This would appear to be an excellent time for the industry to explore the building field's potential.

Authorities are agreed that we are heading into a

great period of construction activity in which more buildings will be built and modernized than ever before.

If porcelain enamel has a legitimate claim in this field, there is no time to be wasted in getting underway the necessary activities which will insure for porcelain enamel its proper place in the picture.

We have reached the point in product research where scientists are given a set of conditions for which they are to produce an ideal material. With that as a yardstick, is it reasonable to say that many building needs could well be served by a material having the characteristics of porcelain enamel? I think we may answer that question with a resounding "Yes!" It has color, it has brilliance, it is slick, it is easily maintained, and properly made and installed, it is durable. Also, its cost is competitive with materials which might be used in its place. These are qualities which tie in admirably with contemporary design trends which, as you know, depend on large, clean surfaces for effect. In addition to porcelain enamel's recognized use as a surface for the exteriors of commercial buildings, what are some of the other logical uses which might be exploited?

Certainly interior walls in all types of commercial

buildings, as for example, lobbies and corridors of office buildings. Here porcelain's limitless color palette and washability are great virtues. Banks, theatres, hospitals, apartments, hotels, restaurants and bars offer large wall surfaces for which the designer could well consider your material.

The important point to remember is that the use of porcelain should be advocated only where its qualities and appearance make it a sensible choice. Too many materials are promoted for uses which forethought should tell us any responsible designer will reject. Porcelain has its own individual characteristics which dictate the limits of its use. These should be scrupulously observed by the industry. And why not? If porcelain can win its way into the huge building market where it belongs, there will be business enough for all without any morning-after headaches.

No one outside of the industry is qualified to suggest what remains to be done to develop and maintain production and installation standards. But clearly these points must be satisfactorily answered if you wish to develop a market as demanding of quality as the Building market properly is.

The educational problem is largely one of inspiring designers to think of porcelain's possibilities.

For example, a few years ago the architectural firm of Reinhard and Hoffmeister hit upon porcelain as the right material to cover some conspicuous columns in two banks in Rockefeller Center. Today the banks are there, the columns are there and the porcelain is gleamingly there to the complete satisfaction of all. And in this little story is, it seems to me, the clue to your promotional program. Give designers ideas, stimulate their imagination and direct it to porcelain. How? Easy. Select a dozen really top-flight, forward-looking designers. Ask each to visualize how porcelain might be used in a postwar job. Leave it to the designers. They will surprise you and then you can publicize their proposals and interest all the other architects. That suggestion is not particularly novel and certainly not complicated. But it will work, and you will not have to sell your War Bonds to prove that it will.

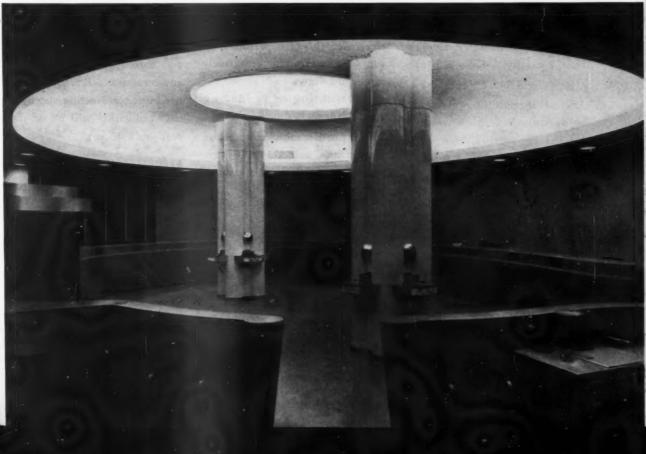
The reason it will work is that these men will have good ideas, your material will be shown attractively and, most important, appropriately. Every designer will be interested and a good many will tonsciously, or unconsciously, start thinking about porcelain in new terms and for new places. And when you show these designs, of course, show them in color.

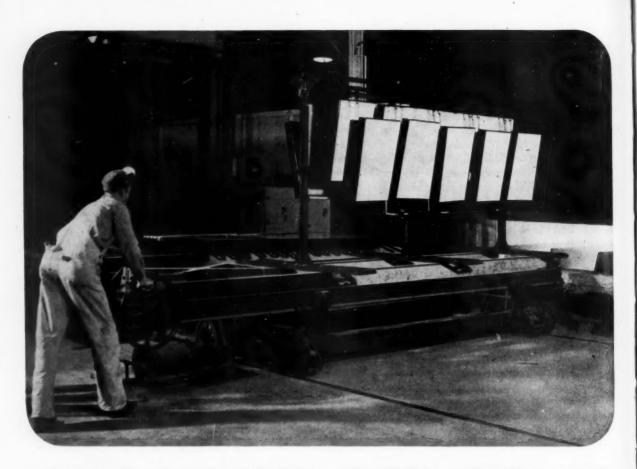
One final word for the sake of emphasis. The unforgivable sin as far as the architect is concerned is the attempted exploitation of a material where it does not belong. Porcelain enamel has limitations as well as virtues. Recognize both, and promote porcelain only for the uses it legitimately serves. If your industry will invite the designers to pick your spots in the Building market, they will not only find them, but cover them with porcelain enamel.

A good example of the use of porcelain enamel to turn a disadvantage into an advantage from the standpoint of architectural design—"Today the banks are there, the columns are there and the porcelain is gleamingly there to the complete satisfaction of all."



PHOTO BY SAMUEL H. COTTSCH





THERE'S NO SAGGING ON THIS FIRING LINE

-because these panels are made from Republic Toncan Enameling Iron, specially processed to prevent sagging and warping.

After firing, they'll be just as flat, as true to shape as when they entered the furnace. There are no strains in the sheets to cause warping or twisting.

Toncan Enameling Iron always is processed to meet enamelers' specific needs—and to provide a high percentage of perfect parts with a minimum loss of material and labor due to rejections. If your product requires deep drawing, this enameling iron can be processed to flow freely in deepest draws—without cracking, wrinkling or producing strain lines.

If your product must be otherwise formed and welded—or if it requires a combination of any of these qualities, they can be combined as desired. Republic metallurgists are well qualified to help you through long and varied experience in irons and ceramics. Tell them what you need in an enameling sheet. The only obligation will be on their part—to help you.

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CERAMIC FINISH



Clyde soldier who died for platoon honored

The mother of Private Rodger W. Young, 25-year-old Clyde, Ohio, infantryman, and former employee of the Veos Tile Division of Clyde Porcelain Steel Corporation, was presented with the posthumus award of the congressional medal of honor for her late son's "gallantry and intrepedity" beyond the call of duty in the southwest Pacific campaign, by Major General Charles L. Scott at Fort Knox, Ky. Young was credited with saving an entire platoon from annihilation.

Others in the family attending the ceremony were Nicholas E. Young, father, and brother Richard.

In the first World War, only 78 citations, an average of one to every 15,400 soldiers in action, were made. Pvt. Young is the only Ohioan in either war to be cited, as well as the first member of the 37th Division to be given this high honor.

Carl C. Angle, foreman of the porcelain enameling department of The Miller Company, Meriden, Conn., died recently of a sudden heart attack at his office in The Miller factory.

Mr. Angle would have been sixty years old the 17th of this month. Friends and co-workers were shocked at Mr. Angle's passing. They indicated that some of the first porcelain enamel reflectors that were worked out when fluorescent lighting came into being were developed under Mr. Angle's direction.

It is reported that Stanley Warner and Luke Marin are now connected with Chattanooga Implement Company, Chattanooga, Tennessee. Both were formerly connected with Samuel Stamping & Enameling Company of the same city.

R. T. Stull, Chief, Heavy Clay Ware Section, National Bureau of Standards, died suddenly January 5. Professor Stull, Head of the Ceramic Department of Illinois from 1911 to 1916, and for several years past at the Bureau, was well known to many of FINISH readers.

It is reported that American Stove Company, Quick Meal Division, St. Louis, Missouri, have just completed the construction of a small temporary enameling plant necessary for porcelain enameling of coal range parts for essential production. Necessity for this move lies in the fact that their large enameling plant was long since completely converted to the manufacture of war products.

Mahlon E. Manson left Washington Eljer (West Coast company closed for the duration), and is now with Norris Stamping in a metallurgical capacity. Production consists of steel and brass cartridge cases.

Seeger promotes three

Three promotions of executives at the Seeger Refrigerator Company were announced recently by Neil H. Griebenow, works manager.

L. Kern Sosey was elevated to factory superintendent, Paul W. Bowman to mechanical superintendent and Eugene P. Morrow to industrial engineer, Griebenow said.

Sosey, a graduate ceramic engineer from Ohio State University, has been with the Seeger Company for ten years and recently has been acting factory superintendent. He went to St. Paul from the Frigidaire Corp. at Dayton, Ohio.

Bowman, a graduate of the School of Engineering, University of Minnesota, has been chemical engineer at the testing laboratory and paint department. He formerly was chemical engineer for the McLaughlin, Gormley, King Company of Minneapolis. He is a member of the American Society of Metals and American Society of Chemical Engineers.



L. Kern Sosey new factory superintendent.

Morrow has been with the Seeger Company 21 years and worked up to industrial engineer through the ranks. He now is in charge of time study and rate setting at the plant.

Foraker joins Pemco.



Announcement comes from Pemco Corporation, Baltimore, Md., that R. L. (Ralph) Foraker has joined their staff and will cover the Chicago territory, which includes Illinois, Indiana, Michigan and Wisconsin, as district representative. The recent announcement places his connection with the organization as of January 1, 1944.

Mr. Foraker is well known in this territory, having spent some twenty-two years in the porcelain enamel industry, most of which has been with Chicago companies. Companies with whom he has been associated previously include Western Electric, Coonley Manufacturing, Cribben & Sexton Co., Ingram-Richardson Mfg. Co., and Chicago Vitreous Enamel Product Co. For eleven years with the latter company he was in charge of field service.

Full speed ahead for P. E. I. program

The Board of Trustees' meeting in Cincinnati on Tuesday, February 15, ordered full speed ahead on the Market Development Program for 1944. They instructed the Committee to make such commitments as were necessary for the production of the literature included in this plan, and to make contracts for advertising.

After considerable discussion of the program, many minor details were adjusted and the plans finally approved. The Committee met immediately after the Board meeting to approve the work done so far. Later it was stated that subscriptions have now passed \$50,000 and that the budget will be completely underwritten in the next few weeks.

The members present expressed the opinion that all preliminary work should be completed at an early date, so that this industry could take immediate advantage of any changes due to the release of sheet steel.

Prisoner of war greets sister over Jap radio

A message from Lt. Alvin Oyen, prisoner in a Japanese prison camp, has been relayed to Mrs. John Hunder, his sister, by the war department and many short wave listeners. The message was broadcast over a Tokyo radio station on January 19 and, in addition to the war department telegram, Mrs. Hunder has received 30 letters and cards and four phonograph records of his message from short wave listeners in thirteen different states.

The message follows:

"This is Lt. Alvin Oyen, U.S.A., sending greetings to sister, Mrs. John Hunder at Benson, Minn., and brother, Otto Oyen, Starbuck, Minn. I am in good health and spirits and hope you are the same. Greetings to friends in the Curtis hotel, Minneapolis, and friends at the Seeger Refrigerator Co., St. Paul. How are you all? As you know, I am a prisoner of war and am now at Zentsuji P.O.W. camp, Shikoku, Japan. Time passes rapidly - reading, studying and I have learned to play bridge. Otto, take care of my insurance policies for me. Do not worry as I am fine. Please write often and give my love to the children. Good byeand good luck to my friends and relatives in Benson and St. Paul."

Lt. Oyen was taken prisoner at the surrender of Corregidor in the Philippine Islands in May, 1942, and Mrs. Hunder had previously received a letter from him in the prison camp. Apparently Lt. Oyen has not received letters from home as his message is addressed also to his brother, Otto, who died before Lt. Oyen became a prisoner.

Before leaving for the service Lt. Oyen was a production control clerk in the porcelain enameling department of Seeger Refrigerator Co.

O. L. Davis has recently been advanced from purchasing to assistant plant manager at Pemco Corporation, Baltimore. Mr. Davis is a graduate of Ohio State University and has held positions with Western Electric, Chicago; Acme Steel and Airtrack Corporation. He joined the Pemco Corporation in 1943 as purchasing agent.

Bert De Witt

Just as this issue was going to press we received the sad news that Bert De Witt, who for years has been in charge of enameling at Geuder, Paeschke & Frey Co., Milwaukee, Wis., died as a result of a heart attack on Thursday, March 2. One of the "old timers" in the industry, Mr. De Witt will be mourned by enameler friends throughout the country.

W. A. Barrows elected P. E. I. trustee

It is reported that at a Board of Trustees Meeting of the P.E.I. held at Cincinnati February 15, W. A. Barrows, president, W. A. Barrows Porcelain Enamel Company, was elected as a member of the Board.



This is a recent picture of Paul Kates who, as announced in the January issue of FINISH, has returned to Ferro Enamel Corporation as Southern Representative after having served with the W.P.B.

Long illness fatal to Homer Swope

Homer J. Swope, well known to many enamelers through his connection with the Economy Enameling Company, Quincy, Illinois, died Wednesday morning, February 9, following an extended illness. Mr. Swope had been in failing health for several months but continued his duties as Postmaster at Quincy, an office which he had held since 1933, until a few weeks ago when he was forced to relinquish his work.



Mr. Swope attended Quincy public schools and was graduated from Knox college in 1920. He left college to enlist in the Navy during the first World War and was commissioned an ensign. (One of his two sons, Homer J. Swope, Jr., is now on duty with the Navy.)

He was one of the oldest members of the Hill-Emery post of the American Legion, having served as commander and also commander of the 15th District. He was a charter member of the Quincy Navy club, and served as the club's first commandant. He was a member of the Quincy Gun Club, and many of his enameling friends are acquainted with his trend to sports.

On the human interest side, Mr. Swope had another occupation. He was the Government's official Santa Claus to Quincy's needy children at Christmas. Through contacting organizations and individuals each Christmas season, he made certain that every needy child who wrote a

letter to Santa Claus was assured a Merry Christmas. (This work is to be continued.)

Voss Brothers Mfg. Co., Davenport, Iowa, peacetime maker of household washers and ironers, signalized the opening of the fourth war bond drive by purchase of at least one bond per person, above the institution's full commitments.

Our report states further that at the beginning of the first drive, the employees were the first in Davenport to win a Minute Man flag for their concern, signalizing 90 per cent participation in war bond purchasing and 10 per cent average payroll deduction for the purpose.

The management stimulated fourth war bond drive investing by appropriating money for prizes which were awarded bond buyers in drawings.

P. E. I. appoints development engineer

The Porcelain Enamel Institute announces the appointment of Edward Mackasek as Development Engineer. The P.E.I. announcement states

"Mr. Mackasek was formerly executive vice president of the Beaver Enameling Company of Ellwood City, Pa. A graduate of Cooper Technical Institute, he is a qualified engineer with a sound knowledge of structural and mechanical design as related to the development of products to be porcelain enameled. He possesses an intimate knowledge of the problems of production based on a manufacturing experience of many years that has covered all branches of the industry. He has taken an active part in promoting higher industry standards through technical research and improved processes."

Gallagher resigns AWIMA

W. Neal Gallagher, president and general manager of the Automatic Washer Company, Newton, Iowa, announced recently that he will resign as executive secretary-treasurer of the American Washer and Ironer Manufacturers' Association, effective March 31. He stated that increasing responsibilities in his own business

made it impossible for him to continue service in the industry post.

Mr. Gallagher was appointed to the Association office in January, 1942, following the sudden death of Joseph R. Bohnen, veteran secretary of the Association. Through the four years preceding the appointment, Mr. Gallagher held the elective office of president of the American Washer and Ironer Manufacturers' Association. Throughout the entire period he has been active in the interests of the industry, and since the entry of the United States into the war has cooperated in much work at Washington on behalf of the household washer and ironer manufacturers.

Paul Potter a captain



Mr. Potter, formerly of the Tuttle and Kift organization, is at present serving in the Armed Forces as a Captain and is reported to be doing outstanding work in the training and development of new recruits.

Use of liquefled petroleum increases

(Rubber and gasoline involved)

It is reported that the marketed product of liquefied petroleum gases for fuel and miscellaneous purposes is estimated to have increased 19% in 1943 over 1942 to 635,000,000 gallons. Rubber and aviation gasoline consumed rapidly increasing quantities of butanes and propane, particularly in the last half of 1943.

Movie starlet, Roper president's daughter and Sinatra



How would you like to have this new gas range in your kitchen?

Miss Barbara Hale, Frank Sinatra's leading lady in the movie "Higher and Higher," paid a visit recently to the Roper factory where she is reported to have taken keen interest in the production of war products such as 75 mm shot, aircraft landing gear, large naval pumps, and the new model Roper gas range. As a result of this visit by Miss Hale to her home town the following story is recorded from Frank Sinatra's first meeting with Barbara on the set of "Higher and Higher":

Frank: "You say you're from Rockford?"

Barbara: "Yes. That's right."

Frank: "I'll always have a soft spot in my heart for that town. You see when I first started out, I appeared on the bill at the Coronado Theatre there. I really had a bad case of the jitters. After the performance I went next door to get a sandwich. I was feeling pretty low.

"Then four girls seated in a booth called out, 'Hello Frank. We liked your singing. We think you're swell.' That gave me the confidence I needed."

Barbara: "It's a small world, Frank. It so happens that I was one of those four girls." Nancy Hobson, daughter of Roper President Stanley H. Hobson, was another member of that group of four, certainly the first of the ardent Sinatra fans.

Chicago Tribune reports a "guarded prediction" from WPB of improved newsprint supply the latter half of '44.

Dana Chase, Jr., conducts 'one-man' scrap paper drive

In a phone call from Washington following the "paper hearing" for finish your editor suggested a "one-boy," "one-day" scrap paper drive to his 15-year old son. The result: A quantity of salvage paper equivalent to the total paper used in this issue of finish collected, weighed and tied. It has been donated to the Boy Scouts.



Celebrities attend Ing-Rich bond rally



In this photograph taken in the Ingram-Richardson plant at Frankfort, Indiana, during a recent bond rally are: Dana Andrews, a new film star; Cecelia Parker, who played the part of Mickey Rooney's sister in

the Hardy family pictures; Lucky Gordon, wounded veteran of Guadalcanal; Mayor Bert Lucas of Frankfort; and Harland Croy, theatrical representative.

American Ceramic Society's second war council

Enamel division program—46th annual meeting

The American Ceramic Society's Second War Council, combined with the 46th Annual Meeting, is scheduled to be held at the Wm. Penn Hotel, Pittsburgh, Pa., starting Sunday, April 5. The local committee:

General Chairman: A. P. Thompson, Mellon Institute, Pittsburgh, Pa.

Pittsburgh Local Section Chairman:
W. C. RUECKEL, Koppers Co., Pittsburgh, Pa.

The following are chairmen of the individual committees:

Entertainment Committee: HAROLD E. SIMPSON, Mellon Institute.

(Mr. and Mrs. Ernest Hommel, O. Hommel Co., Pittsburgh, Pa., represent the enamelers on this committee.)

Ladies Entertainment: Mrs. W. C. RUECKEL, Mt. Lebanon, Pa.

Equipment and Supplies Committee: JOHN W. JORDON, Mellon Institute.

Service Committee: E. C. HENRY, Pennsylvania State College, State College, Pa.

Publicity Committee: F. W. Adams, Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Ceramic Camera Club: VICTER H. REM-INGTON, B. F. Drakenfeld & Co., Inc., Washington, Pa.

The Board of Trustees of the Society will meet on Saturday, April 1. Sunday's Schedule includes a morning meeting for the Fellows; a luncheon meeting of the Institute of Ceramic Educational Council; an afternoon meeting of the Institute of Ceramic Engineers; and a dinner meeting for Keramos.

At 9:00 P.M. Sunday, Hoyt C. Hottel of the Department of Fuel Engineering, Massachusetts Institute of Technology, will deliver the Edward Orton Jr., Fellow lecture. Mr. Hottel's subject will be "Infraray Heating." At present this speaker is conducting research work for the National Defense Research Committee of the Office of Scientific Research and Development.

War Conference General Session Monday, April 3 — Ball Room

Presiding: CECIL EUGENE BALES, President A.C.S.

Morning:

1. Be Vigilant

By Major Albert J. Stowe: Military Intelligence, Office of Civilian Defense, Washington, D.C.

2. Chemistry in Defense and Recovery.

BY EDWARD R. WEIDLEIN: Mellon Institute of Industrial Research, Pittsburgh, Pa.

3. Postwar Housing Relationship to Industry.

By I. W. Clark: Westinghouse Better Homes Dept., Pittsburgh, Pa.

4. Porcelain Enamel in Postwar Enamel Industry.

By Robert A. Weaver: Ferro Enamel Corp., Cleveland, O.

Afternoon:

5. Wage Incentives.

By James Finney Lincoln: Lincoln Electric Co., Cleveland, O.

6. Ceramic Problems and Application of Wage Incentive Methods Thereto.

By Douglas T. Sterling: Douglas T. Sterling Co., Stamford, Conn.

7. Industry Prepares for Peace.
By John A. Stephens: United States
Steel Corp. of Delaware, Pittsburgh,
Pa. (Chairman, Allegheny County of
Committee for Economic Develop-

8. Industrial Design and Creative Postwar Thinking in Glass, Clay and Enamel Industries.

By J. GORDON LIPPINCOTT: Dohner and Lippincott, New York, N.Y.

Enamel Division Program: Tuesday, April 4 — Parlors B & C

Chairman: D. G. Bennett. Secretary: D. G. Moore. Committee: H. D. Carter.

 Mechanics of Enamel Adherence: XVI, Influence of Manganese Oxide on Metal Precipitation at Ground-Coat interfaces.

By R. M. King: Dept. of Ceramic Engineering, Ohio State University, Columbus, Ohio.

This paper offers experimental data on the influence of manganese oxides when used alone and with mixtures of cobalt and nickel oxide.

2. Abrasion Resistance of Porcelain

BY CLARK HUTCHISON: Ingram-Richardson Manufacturing Co. of Indiana, Inc., Frankfort, Ind.

Although a rather wide range of abrasion indices was obtained, the majority of the enamels gave relatively close results. The SiO₂ content of a base frit was progressively decreased with corresponding effects noted on acid resistance, specular gloss and abrasion resistance. Results showed that abrasion index was affected by formula change.

3. Chemical Durability of Porcelain Enamels.

BY RALPH L. COOK AND A. I. AND-REWS: Dept. of Ceramic Engineering, University of Illinois, Urbana, Ill.

Cylindrical cup-shaped, commercially drawn samples were coated with the following enamels: ground coat, white fluoride cover, white antimony, white zirconium, acid-resistant white, sign blue, blue zirconium, acid-resistant blue, and an acid-proof blue. Loss in weight of these enamel surfaces was measured. Solutions studied consisted of different concentrations of the inorganic acids, alkalis, organic acids and numerous salts at both room and boiling temperatures. Surfaces showed considerable variation in resistance to chemical attack.

4. Properties of Enamel Slips.

BY BURNHAM W. KING, JR., HERBERT D. CARTER, AND HARRY C. DRAKER: Harshaw Chemical Company, Cleveland, O.

Five clays and their properties when used to suspend porcelain enamels were studied. Fundamental data were first obtained on the clays, which were then milled in different proportions with several types of frits. The properties of the resulting slips were studied. The pickup weight was used as a basis of comparison.

5. Enameled Utensil Manufacturers Council Standard Thermal-Shock Test for Porcelain Enameled Cooking Utensils.

By F. A. Petersen and A. I. And-Rews: Department of Ceramic Engineering, University of Illinois, Urbana, Ill.

The equipment and method used in testing porcelain enameled utensils for thermal shock resistance is described. Results based on many tests indicate that increased thickness of enamel results in lower thermal-shock resistance.

6. Relation of Metal Gauges and Enamel Thickness to Impact Resistance of Porcelain Enameled Utensils.

BY PETERSEN AND ANDREWS.

Three series of standard two-quart pudding pans are made of different gauge metal and coated with one, two, and three coats of enamel were tested for impact using the E.U.M.C. standard impact test. Impact resistance increased with increase in metal gauge and also with increase of enamel thickness.

7. Relation of Bottom Radius to Impact Resistance of Porcelain Enameled Utensils.

BY PETERSEN AND ANDREWS.

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Refrigerator manufacturers feature war programs at furniture mart

A T THE recent Mid-Winter Furniture Mart the principal refrigerator manufacturers were in evidence with rather extensive displays. For the most part finished products were subordinated to displays of wartime programs.

The Norge display included airplane parts, guns, gun turrets, and other important war products manufactured by Norge Division of Borg-Warner. In the background were a number of Norge pre-war products including ranges and room heaters.

Kelvinator's principal display was a presentation of their extensive advertising program. An absorbing feature of this display was a number of "scrap books" in which original correspondence representing comments from service men concerning the Kelvinator advertising program were shown.

In the Frigidaire section were cutaway demonstration samples showing machine guns, hydraulic valves, variable pitch propellers, etc. This display also included electric ranges, water coolers, refrigerators and water heaters of Frigidaire manufacture. Of interest to enamelers was the fourcompartment home freezer with black porcelain enameled top.

The Westinghouse show room gave a complete demonstration of the part advertising plays in war-time activity and an outline of the "home service" helps supplied to assist the appliance user. An interesting feature of this exhibit was the automatic "Laundromat" of which about 25,000 were in use before the war eliminated further production.

In the General Electric booth the visitor was confronted with a demonstration display of a complete electrically heated aviation suit. In this boon to high altitude fliers electricity is depended upon to keep fliers warm from tip-toe to finger-tip. G.E. also displayed a variety of small appliances.

With some 30,000,000 electric appliances for the home now in use, the educational programs of the various refrigerator companies can be considered an important service to dealers and appliance users alike in the interest of maintaining satisfactory operation until new appliances are again available.

In addition to the refrigerator displays a number of stove manufacturers and other major appliance manufacturers were also represented. Included were present "victory models."

In an exhibit of Detroit Vapor Stove Division of Borg-Warner the first model of the four-burner victory model gas range for 1944 production was on display. Aside from an asbestos back, the range is all porcelain—both inside and out.

Post-war planners hear Howard Blood

Before the post-war planning meeting of the National Retail Furniture Association Howard Blood, president of Norge Division, Borg-Warner Corp., voiced the opinion that only properly administered price regulation of essential civilian goods can prevent runaway inflation, wide-spread disappointment and serious delays in the production of needed goods during the transition period.

He voiced a warning against illyconceived regulations that may not consider all important conditions when he said:

"Price control of essential civilian goods must be based first on recognition of actual costs under current conditions and actual taxes; and must leave the manufacturer enough after these costs and taxes are paid to justify the risks and costs of reconversion.

"Only with price levels which leave business a reasonable profit after all costs and taxes, can free American enterprise take up the job where it had to be dropped, and start to again provide the goods so badly needed and the jobs which will soon be so badly needed. Only under such a price policy can prices be regulated, to prevent runaway inflation, while at the same time encourage the manufacture of goods, which, when they eventually become plentiful enough, will, by their own abundance, provide the final cure for inflation. . . .

"Free price competition alone will again set in motion those forces of incentive, initiative, and enterprise which will produce more goods at lower costs and consequently improve the standard of living and secure maximum employment.

"If the term 'Post War' means 'after the war is all over,' I think you will join me in hoping for material freely available for use in making consumer goods; labor free to accept employment in making consumer goods; prices set by the forces of free competition and not by government edict; and business taxes which will leave enough profit to encourage people to back up new enterprises with their savings and established companies to invest large sums in plant improvement, in research and promoting to manufacture and use of better and cheaper products.

"We are hoping that when we really get to 'Post War' we will have free competitive enterprise. Real freedom again. Not a limited list of freedoms which may make us forget other freedoms we have lost—but freedom for every man to choose his own job and incentive to get ahead—and freedom to invest his own dollars and incentive to put his dollars to work. . . .

"Only an optimistic view of the future will give the appliance industry the courage to do the things that must be done, to provide the articles so badly needed during the period of transition from war to peace."

It is interesting to note the amount of porcelain enamel that most manufacturers have found it possible to use on "victory model" appliances without exceeding weight limitations set up by the War Production Board. Many of these models will be small, but efficient and durable.



Pressed Metal Institute aids war production

By W. W. Galbreath . EXECUTIVE VICE PRESIDENT

THE Pressed Metal Institute, formed early in 1943, is now well on its way with a program designed to offer valuable assistance to the Government and individual war product manufacturers.



S. J. Menzel, vice president.

It's common knowledge that experts in the stamped metal field have assisted local Ordnance offices, various bureaus and departments of the Government and various divisions of the War Department with many tough production problems since the early days of war production. Innumerable examples of conversion from machined forgings, castings, etc., reflect the close cooperation between war agencies and the individual stamping companies. The result has been the elimination of many bottlenecks and a saving in many instances of valuable man hours in production time, plus valuable savings in ultimate cost.

War program

The Pressed Metal Institute was formed to coordinate the efforts of the individual manufacturers and bring together the best engineering brains of the stamped metalware field so that such cooperative wartime activities could be accelerated and made

more effective. The organization is set up to operate nationally through its headquarters office in Cleveland, and locally through district chairmen and local meetings.

It is recognized that each production area has its own problems that can be served best in local district meetings. Individual participating companies have an opportunity in this way to get-to-the-bottom of specific and sometimes strictly local production problems.

Executives of the Institute attend the district meetings, and national



Geo. E. Whitlock, president.

meetings are held as required. The headquarters office in Cleveland is set up as a clearing house for the whole industry, and to provide a central means of contact with Government and War Agencies such as W.P.B., O.P.A., Army, Navy, Maritime Commission, etc.

It may be repeated that individuals and companies can point to signal achievement in cooperation to date with the agencies mentioned, but it is the belief of Institute executives that much more can be accomplished as a result of cooperative effort. Our function is not only to assist in redesign and conversion problems concerning war material, but also, where

desired, to assist in locating available facilities and manpower to complete redesign for production and eliminate delays in manufacturing.

Post-war too

It is believed that impressive economies in materials, machines, manpower and cash now being realized in wartime developments through the use of pressed metal can be carried over into production of lower cost articles of many types when consumer goods can again be manufactured.

New techniques of manufacture and new materials involving the use of stampings will unquestionably be used to good advantage in the production of civilian goods as the result of experience gained in war product production.

Institute executives are convinced that during the transition period from wartime to peacetime production reconversion problems will be as complex as were the problems of conversion to war production. It is believed that many of the mistakes made in liquidating the war effort following World War I can and should be avoided. The Pressed metal manufacturers must play a part in this.



O. L. Earl, market development

The Institute proposes in this connection to cooperate with Government agencies all along the line in the interests of all pressed metal manufacturers.

Committees are being appointed to to Page 48 →

Utensil Council handles technical problems and Gov't contacts for hollowware group

By Professor F. A. Pelersen · UNIVERSITY OF ILLINOIS

THE Enameled Utensil Manufac-turers' Council is an organization of sixteen manufacturers of porcelain enameled utensils. This group is under the direction of D. S. Hunter of D. S. Hunter and Associates, Cleveland, Ohio. Each member company has one official representative at Council meetings which are held at regular intervals. The policy has been established that the work of the Council is to concern itself with problems which are of an industry-wide nature, and is not to delve into individual problems unless some aspect is of interest to all of the member companies. Principal activities of the group are delegated to working committees consisting of men from within the field who are best qualified to carry out the work to be done.

One of these committees is the W. P.B. Industry Advisory Committee for hollowware manufacturers consisting of the following members:

W. J. Vollrath, Polarware Company, Sheboygan, Wisconsin.

R. M. Fawcett, Republic Stamping & Enameling Company, Canton, Ohio.

F. S. Earnshaw, United States Stamping Co., Moundsville, West Virginia.

F. E. Jones, Jones Metal Products Company, West Lafayette, Ohio.

D. S. Hunter, D. S. Hunter and Associates, Cleveland, Ohio.

W. F. Lewis, Lisk Manufacturing Company, Ltd., Canandaigua, New York.

This committee meets at regular intervals with Government officials in Washington to help iron out any difficulties which arise in administering to the industry. The members of this committee also offer suggestions and criticisms of orders which affect the enameled hollowware group. The members of this group only act as advisors and do not have any jurisdiction over the industry.

There are three standing commit-

tees of the Council that are of special interest: these deal with technical problems, post-war planning, and publicity. The members of these committees are:

Technical

E. C. Dexheimer

H. C. Arnold

E. H. Kelsey

B. S. Kirk

P. A. Mallonn

A. J. Vollrath

Post-War Planning

W. B. Moore

E. P. Altemeier

C. E. Christman

W. H. Grabbe

J. C. Vollrath

Publicity

C. E. Christman

A. J. Kieckhefer

J. C. Vollrath

The Enameled Utensil Manufacturers' Council, as part of its research and development program has for the past three and one-half years sponsored a full-time cooperative research project in the Engineering Experiment Station, Department of Ceramic Engineering, at the University of Illinois. This project has been under the direction of Dr. A. I. Andrews. Professor F. A. Petersen is employed on a full-time basis for this work.

The technical committee of the Council works in conjunction with this project. Another group of technical men, consisting of representatives from each member company is called together occasionally to be brought up to date with the research developments.

One important function of this research is the development of standard tests for the industry. This objective has been achieved to a great extent with the adoption of standard test procedures for the determination of the Impact, Thermal Shock, and Solubility resistance of enameled ware.

Other objectives of this project are the development of a commercial standard for the industry, cooperation with government agencies in drawing up procurement specifications for enamelware, the study of enamel properties as affected by physical and chemical variables, and the regular testing of ware submitted by the manufacturers as a group.

The latest committee to be formed is the Post-War Planning Committee. This group has just started on its interesting task. No concerted effort had been set forth on post-war planning prior to this time, since the industry was too busy producing materials for the armed forces. The list of items, other than enamelware, which have been made by this industry is a very lengthy one.

The publicity committee works in conjunction with the Lawrence H. Selz Organization of Chicago, Illinois, who handles publicity for the industry. Some very interesting booklets and a multitude of radio scripts and newspaper articles dealing with enamelware have been released.

Utensil Standards and Specifications.

- (1) "Enameled Utensil Manufacturers Council Tentative Standard Impact Test for Porcelain Enameled Cooking Utensils." G. H. Zink and A. I. Andrews, J. Am. Cer. Soc., 8 (22) 283-86 (1943).
- (2) "The Enameled Utensil Manufacturers' Council Tentative Standard Solubility Test for Porcelain Enameled Cooking Utensils." F. A. Petersen and A. I. Andrews, Presented at the Forty-fifth Annual Meeting of the American Ceramic Society, Pittsburgh, Pa., April 20, 1943.
- (3) Commercial Standard CS 100-42, "Multiple-Coated Porcelain-Enameled Steel Utensils." National Bureau of Standards, Division of Trade Standards, 1942.
- (4) (a) Treasury Department, Procurement Division, Specification No. 523 for "Enamelware; Bakeshop and Kitchen."
 - (b) Treasury Department, Procurement Division, Specification No. 528 for "Enamelware; Hospital and Sickroom."

PORCELAIN ENAMELING FURNACES THE BEEN Built by Ferro

More than 600 furnaces . . . as well as 51 complete porcelain enameling plants . . . have been designed and built by Ferro Engineers in the past twenty years. Satisfied customers include:

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Sunbeam Electric Mfg. Company Tappan Stove Company Toledo Porcelain Enamel Products Company Welbilt Stove Company Westinghouse Electric & Mfg. Co. Wrought Iron Range Company General Steel Wares Ltd., Canada Canadian Westinghouse Co., Ltd., Canada Electrolux Ltd., England R. & A. Main Ltd., Scotland Troqueles y Esmaltes S. A., Mexico Fabrica Ferro Esmaltado Silex S. A., Cia. Argentina De Productos Enlozados Y Anexos S. A., Argentina Obuljen Mardones & Pacheco Ltda.,

Chile
Metters K. F. B., Pty. Ltd.,
Australia
Radiation (New Zealand) Ltd., New
Zealand

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At your Service!

Thanks to a large volume of special war constructionincluding the building of 43 new heat-treating furnaces and the conversion of 22 others—our Engineering Staff is still on the job and already working on Postwar Projects.

In fact, quite a number of future projects for Porcelain Enamelers are even now well under way. These include new furnaces for A-B Stoves, Inc., Erie Enameling Co., Florence Stove Co., Lisk Manufacturing Co., Lindemann & Hoverson Co. and others.

If you and your organization are faced with a "reconversion" problem, or are planning to expand or modernize your facilities, it will pay you to get in touch with our engineers without delay. You'll find them well versed on new product developments and advanced production techniques. Also, willing and able to help you in designing the best plant layout for your needs.

Write or phone today and make an appointment to discuss your Postwar Plans. The sooner you act, the sooner your job can be scheduled-for early completion after the war.

Ferro Engineering Division

ENAMEL CORPORATION FERRO

4150 East 56th Street Cleveland 5, Ohio



War conference of washer and ironer manufacturers

THE Terrace Room of the Morrison Hotel, Chicago, was filled with representatives from the country's leading washer and ironer manufacturing companies recently for their 29th Annual Meeting. Attention of the group was focused on current wartime and re-conversion problems and plans for inter-industry and Government cooperation, which should lead to stabilization of the industry immediately following the war.

Mr. John M. Wicht, director, Home Laundering Equipment Division, General Electric Company, Bridgeport, Conn., who is beginning his third term as president of the American Washer and Ironer Manufacturers' Association, stated: "Our armies carry washing machines with them almost as they do ammunition, or improvise them from such sources as oil-drums and incapacitated jeeps practically as soon as they capture a beachhead. American influence is spreading thru out the world to make more peoples want more things for better living. by the leveling of economic barriers and the rehabilitation of war-ridden countries.

Nomination of the Association's entire 1943 official roster and its unanimous reelection was regarded as industry-wide endorsement of the policies and post-war planning program announced a year before by President Wicht.

Mr. Wicht prophesied world wide use of American - made household washers following the war. In this connection he plans to name an industry committee to study world export potentialities.

Judson S. Sayre, president, Bendix Home Appliances, Inc., South Bend, Ind., chairman of the industry advisory board appointed by W. P. B., gave the details of negotiations for resumption of washer-ironer manufacturing when the progress of the war permits. Mr. Roy A. Bradt, vice president, The Maytag Company, Newton, Iowa, and chairman of the Association post-war planning com-

mittee, under whose supervision the industry's recommended plan for reconversion was prepared, described its latest stages.

As for the home front, Institute statisticians estimate that American homes will require household washers at the rate of 2,500,000 yearly through the decade "beginning with the year V-1." The demand for ironers was estimated at 300,000 in the first year and 400,000 in the second, climbing to a ratio of one ironer to every five washers within a few years after resumption of production for civilian needs.

Bernard J. Hank, president, Conlon Corporation, Chicago, who presented the estimates of washer-ironer postwar potentials, submitted the forecast as chairman of a sub-committee which has spent almost a year surveying the industry's expansion possibilities. Highest washer production before Pearl Harbor was 1,959,887 units in 1941. The Hank Committee estimated post-war residential construction at the rate of 900,000 units yearly in the first ten years, compared to 300,-000 annually in the ten years preceding World War II. With the competition that can be expected from other fields "hard-driving sales and advertising tactics" will be required as the post-war selling period is re-entered, the Hank Committee's report warned.

Plans for the information and guidance of washer-ironer manufacturers in the re-conversion and post-war periods have been evolved, and will be continued by Mr. Bradt's committee, named early in 1943 after the Association membership had approved President Wicht's proposed program for the industry. Each committee member heads a sub-committee handling one phase of the study.

Breakdown of commercial laundries was declared by I. N. Merritt, president, The Meadows Corporation, Chicago, and co-chairman of the advertising and public relations sub-committee, to have been "worth \$10,000,-000 to the washer-ironer makers." He urged expansion of the Association's public relations program to promote laundries in post-war houses, to draw salesmen to the industry and to sell teenage girls on the advantages of home laundering by introducing special washer-ironer manuals and the appliances themselves into colleges and public schools.

New standards

P. Eduard Geldhof, vice president, 1900 Corporation, St. Joseph, Mich., reported on the work of the materials and standards sub-committee, of which he is chairman. In his report he pointed out that while standards have been established by various individual manufacturing companies in the past, industry standardization has been lacking. This committee, of which G. I. Cockerill, project engineer, Apex Electrical Mfg. Co., Cleveland, Ohio, is secretary, has made a thorough study of new materials and processes, and has placed responsibility for test standardization under individual committee members. One

to Page 48-

Washer and ironer men in session at Morrison Hotel, Chicago.



Formed metal plumbing ware manufacturers discuss current problems

A T A MEETING of the Formed Metal Plumbing Ware Association held at the Hotel Cleveland, Cleveland, Ohio, February 11, members and associate members discussed their mutual problems in an all-day meeting. Their discussions covered both problems relating to current war production and probable post-war conditions.

New group chairman

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In the early morning session, for members only, a new chairman for 1944 was elected. C. J. Rodman, president, The Alliance Porcelain Products Company, is to head this group for this year. The retiring chairman is R. B. Jenkins, Briggs Manufacturing Co.

In a joint meeting of members and associate members, the group heard an address by R. A. Dadisman, manager, Market Development Division, The American Rolling Mill Company, in which he covered postwar prospects for the plumbing ware industry in detail. (See article in this issue of FINISH based on the text of Mr. Dadisman's address.)

W. P. B. represented

In the next address, Wm. McDonald, deputy director of Plumbing & Heating Division of W.P.B., brought a picture to the manufacturers of some of the problems involved in reconversion to civilian production as viewed by one who is in intimate contact with such problems constantly. Mr. McDonald had charge of the war housing problem for W.P.B., and was formerly a member of the Cast Iron Enamelware Institute.

Early orders, said Mr. McDonald, were of necessity arbitrary, and were many times considered on a patriotic basis. Many of today's problems are concerned with relaxation of restrictions and everyone has a claim for the right to participate. For some time W.P.B. has been working with industry advisory committees. Some of the earlier ones were

not very successful as they were not "operating" committees. An attempt is now being made to change over to an operating committee basis.

The Plumbing and Heating Division of WPB takes up all cases with the industry committee before action is taken. This, said Mr. McDonald, is now general W.P.B. policy. Interests of both cast iron and steel must be recognized. Every committee member has the right of written dissent on any decisions to be reviewed by order committees.



C. J. Rodman, new chairman.

Included with plumbing and heating are home and commercial cooking appliances.

Present cooperative work will stress the things that can contribute most to smooth reconversion by the group. There seems no prospects for immediate production in formed metal plumbing ware plants, even if materials were available, due to complete war production in these plants. High priorities for tubs have been given only in a few most critical cases, where they were absolutely required, to avert loss of essential war production.

Both the National Housing Agency and the Office of Civilian Requirements are working on minimum requirements. General policy seems to remain that there will be no expansion until the European climax. The only approved program is one for NHA, but programs are being made up for the second quarter pending developments.

Lumber most critical

Mr. McDonald indicated that three of the most severe shortages at present are, in the order of their importance: lumber, paper cartons and steel (plate and heavy sheets). The plumbing industry is normally one of the largest users of copper and copper base alloys. It is expected that not before the third quarter will there be relief in many critical materials.

The program of the Plumbing and Heating Division will be to change over as rapidly as possible from substitute materials to normal materials. One reason for this is that it has been proved that in connection with brass parts only one-third the man power is required as for substitute materials. The steel limitation on gas ranges was offered as one example of a needed change.

There is some hope for provision to use excess inventories which consist mostly of raw materials rather than finished products.

Bureau of Standards speaker

Mr. I. J. Fairchild, Chief Division of Trade Standards, National Bureau of Standards, was the headliner for the afternoon session. In his talk Mr. Fairchild stressed the fact that there has never been a Federal purchase specification written that could cover every possible important factor having to do with the purchase of a given product or material. He used as an illustration the fact that with even as old and established product as cement, color characteristics are not covered.

One interesting part of his discussion concerned itself with probable competitive materials in the plumbing ware field following the war. He predicted principal competition between industries more than between companies. Possible materials for use in sanitary ware products include porcelain enameled formed

Enamelers' Club holds second wartime meeting

THERE was a fine turnout of enamelers at the second wartime meeting of the Chicago District Enamelers' Club, and there is every indication that as a result of the success of the first two meetings additional sessions will be held as worthwhile programs are formulated. The program committee responsible for their development consists of: W. J. Plankenhorn, ceramic engineer, Federal Electric Company, and E. E. Howe, ceramic engineer, Chicago Vitreous Enamel Product Co. Mr. Howe is vice president of the Chicago Club.

The subject for discussion at this recent meeting was "New Developments and Post-War Prospects for Enameling." Headliners on the program were Fred Sutphen, enamel consultant, American Rolling Mill Company, and Frank Porter, ceramic engineer, Inland Steel Company. The balance of the program consisted of open discussion, a short business meeting and professional entertainment.

Frank Hodek, president, General Porcelain Enameling & Mfg. Co.—secretary-treasurer of the Enamelers' Club—indicated that the Club's finances were in good order.

Mr. Sutphen, the first speaker, prefaced his remarks to the group with the opinion that the future for enamel markets looks very good. He was frank to state that many improvements in materials and processing should and would be made. He stressed the fact that such improvements must range through the two most important materials, frit and steel, as well as in the enameling plant. His picture of the future enameling plant included air conditioning for better results in connection with both comfort and cleanliness.

Mr. Sutphen reviewed briefly the background of progress in the manufacture of enameling sheets, recalling the necessity for intervening annealing in drawing operations which was later eliminated or greatly reduced. Boiling has been improved to an extent where enameling stocks may be expected to be 90% non-boiling. He

feels it will be possible to retain all of the good qualities in present sheets, such as properties of bonding, improved physical properties of the sheets, etc., and work toward a production sheet entirely free of primary boiling and reboiling and other defects that may cause difficulty in enameling. He further urged a serious study of cleaning and pickling problems. In his opinion the industry has been using essentially the same cleaning methods for about forty years.

With such improvement in cleaning and other enameling operations he visualizes a worthwhile reduction in re-ops, with resultant lower cost—possibly even white enamels direct on the metal.

Mr. Porter presented a paper based on extensive laboratory work, much of which pertained to white enamels applied directly to the steel. While it was explicitly explained that the work described was in the laboratory stages and should, therefore, not be construed to represent production results, it was quite evident that Mr. Porter feels there are definite possibilities in connection with the production of white enamels that can be applied without the conventional dark ground coat.

If such laboratory work can later be

satisfactorily transposed to successful plant operation a number of worthwhile advantages may be obtained aside from the possible elimination of cobalt-bearing ground coat enamel. Possible gains would be in connection with reduced thickness, reduced firing temperature and a possible reduction in those defects attributable to fluctuating oxidizing conditions.

Mr. Porter also brought out improved drawing characteristics in enameling stocks, stressed the need for more up-to-date cleaning methods and recommended nickel flash for the improvement of enamel bonding.

E. H. Shands, club president, spoke for process control in the enameling plant and accepted for the enamelers their responsibility in the three-way program (frit-steel-enameling) for ultimate improvement in enamel frits, greater freedom from metal defects and improved enameling technique.

Professor A. I. Andrews of the U. of I. pointed to previous laboratory work in extremely thin coats of porcelain enamel, and indicated there should be excellent possibilities for a practical reduction in enamel thickness far beyond the point of former standard practice.

Tentative plans call for the next meeting to be held sometime in April. At this meeting officers will be elected. The nominating committee appointed consists of G. G. Hanson, Consolidated Feldspar Company; W. J. Plankenhorn; and W. G. Martin, A. O. Smith Corporation.



FRED SUTPHEN, American Rolling Mill Co., and FRANK PORTER, Inland Steel Company, were the featured speakers at the second Chicago Enamelers' Club Meeting.



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MARCH • 1944 finish

to include 2.05 parts per million of silica which is not removed by the exchange process. The water in this plant is used for a number of different purposes and they include the purification and washing of chemical products, the preparation of patent medicines, drugs, antiseptics, and the washing of ampoules. With an excess of pure water available, a number of new purposes were found for the high quality water which they are producing at 12¢ per 1,000 gallons.

Another installation was installed just a year ago in a Defense Plant in Florida. This plant is producing 60,-000 gallons of water between regenerations at a flow rate of 3,000 gallons per hour. This plant is operating a large Anodizing Department for the oxidation of aircraft aluminum parts. They had followed the chromic acid method oxidizing aluminum and found that in the hot rinse step following oxidation 15 grain water precipitated noticeable traces of calcium salts on the anodized piece. A deionizing unit was piped to the bath as well as to the chromic acid tank so that make-up due to drag out was maintained with salt free water. Whereas it was necessary to employ considerable help in the polishing of aluminum parts coated with calcium deposits, once the de-ionized water was used this costly step could be avoided completely. Completely saltfree water, it was observed, was the only approach to the solution of this air craft problem. Raising the sodium content of the supply or exchanging calcium for sodium as in other zeolitic processes would have had aggressive chemical effect on the aluminum surface.

A third installation was chosen to exemplify the lower range of soluble solid content on which the resins have been found to be commercially effective. In one of the nation's foremost distilleries a battery of steam still units was producing more than 4,000,000 gallons of distilled water annually for the reduction of high proof spirits. Were it not for the extreme danger of contaminating their product it would have been ideal to use steam condensate for reduction

purposes. Examination studies of the condensate convinced the distilleries, however, that carry-over from the boiler plant plus soluble iron, picked up in return lines produced a variance in solids from 10 to as high as 60 parts per million. It was suggested that this condensate water be used as a raw supply to exchanger equipment as any undue changes in the supply would not effect the exchange qualities of the resins. This was done and the effluent was kept at temperatures below 93° F. The solid content of the final water averaged 1.5 parts per million.

A large chemical manufacturing plant in Cincinnati required water for making up their product, as well as washing their material with a pure water at a later stage. The raw water varies from 8 to 14 grains per gallon and the consumption was estimated at 500 to 600 gallons per minute on a 24 hour a day basis. The equipment furnished consisted of six 8' diameter reactor tanks, three for each of the two stages, of which two are in operation in parallel all the time while the third is down for regeneration. All tanks and pipe are rubber lined and the equipment is regenerated on a definite regular regeneration schedule. The water produced has met all the requirements for the manufacture of this chemical and in addition the water has been found to be satisfactory for the laboratory operated in connection with the plant. The steam stills used for laboratory distilled water have been shut down and the de-ionized water used in its place. A regular testing schedule was set up at this plant and during the period the equipment has been in service, at no time has the effluent tested above 10 parts per million.

A plant in the Southwest required large quantities of water for quenching aluminum after heat treatment. The supply contained high concentrations of sodium chloride and sodium carbonate. The presence of these salts, it was determined, was responsible for etching and corroding the finished material; so it was decided to install a de-ionizing plant to remove them. The plant is similar to the Cincinnati plant and is also produc-

ing 500 gallons per minute, 24 hours a day. Because of the high solids in the supply, however, the cation exchange tanks are 10' in diameter and all six are 10' on the side sheet. The water supply varies from 600 to 1700 parts per million total solids, of which about 70% are present as the chloride salt. The treated water was found to contain about 30 parts per million of which chloride salts amounted to 2 parts per million.

An Indianapolis manufacturer plating silver on various engine bearings found it necessary to de-ionize the water used in make-up of silver plating baths and for washing silver bearings. An analysis of this water showed the following before treatment and after treatment:

	e Treatment per Million	After Treatment Parts per Million
Total solids	399	less than 10
Loss on ignition	103	
Calcium	62	absent *
Magnesium	28	absent *
Iron	0.05	absent *
pH	8.4	5.1
Chloride	15	0
Sulfate	100	0

*As determined by conductometric method The treated water was found to have a resistance of 310,000 ohms per centimeter cubed which was very satisfactory for additions to the plating solutions. The presence of calcium and magnesium salts had evidently affected the adherence of silver to the base metal and this condition was eliminated with pure water makeup. In rinsing the bearings, water spots that had been noticed on the dried pieces when raw water was used were eliminated. Costly buffing and cleaning operations were thereby eliminated. A portion of the water from the water treatment plant was de-aerated and used as make-up for boiler feed work. Needless to say, the plant has had no difficulties with scale formations or with foaming and priming since the installation was put into service.

The ion exchange resins have made possible the preparation of solid-free water equivalent to distilled water in so far as mineral content is concerned by using simple filtration processes. It should be pointed out that these materials have been accepted in a number of industries other than in



Unlike Topsy (in "Uncle tom's Cabin") Hommel Frit did not "just growed." The development of Hommel Frit represents more than half a century of patient planned research by Hommel laboratories and technicians. Today, as in the past Hommel Frit is manufactured from the highest

quality materials. In service and by continued tests it has proven its well deserved place as the dependable and uniform frit in the enamel plant. Make your own test, we invite you to put it thru your toughest obstacle course; then draw your own conclusions.

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Wartime heating unit . . (Continued)

turers. This gave us the solution to a problem which had existed for years in connection with any development work pertaining to the use of cold rolled steel tubing in burner units. With this high temperature enamel, which is applied in an extremely thin coat, that does not soften or become tacky at operating temperatures we were immediately in position to design a unit more nearly comparable to the standard chrome-nickel alloy product. While the new unit is not quite as fast as nickel-chrome alloy, it is still a fairly fast unit and a great improvement over the design incorporating solid castings.

Method of manufacture

The complete burner consists of a body stamping of .025 steel, sheet metal cross braces of .050 steel, welded at the center, and from 4' to 8' (depending on burner size) of cold rolled steel tubing (3%" size — .031 wall) fastened mechanically to the body stamping and forming, after porcelain enameling, an absolute water and grease-tight connection. This complete unit is sandblasted to produce a surface suitable for enameling.

The unit is dipped in a blue, ground coat type enamel. The dried blue enamel is then brushed from the top cooking surfaces of the unit. Tongs are employed in the "dipping and shaking" operation. For brushing the top surface the enameler developed an ingenious piece of equipment using a continuous belt "brush" so that the brusher could accomplish his task by merely pressing the top surface of the unit down on the revolving brushing surface.

To this brushed surface is applied a light spray of the special heat resisting enamel. The burner is then ready for the enamel firing operation, which is accomplished in one fire.

We had one little problem in connection with the burner tubes that was extremely important, and that was to keep all moisture out of the ends of the magnesium oxide filled tubing when dipping the enamel. This is accomplished by sealing the ends of the tubes with a glyptal cement prior to dipping.

Proved successful

This new porcelain enamel burner has now been in use for a considerable length of time and results in the field have been very satisfactory. Power companies and users alike are complimentary in their comments, and to date no complaints have been received.

While it was designed as a war-

time replacement unit, some are now being sold for new ranges, 64,000 of which have been released by the War Production Board for early manufacture.

While some type of burner could unquestionably have been produced for emergency use without the protection of the porcelain enamel finish, we do want to give credit to the high temperature finish used on these new burners for making a more practical unit possible, and affording the satisfactory protection needed to make the use of ordinary cold rolled steel practical for this purpose.



The porcelain enameled electric range heating unit produced by Tuttle & Kift, Inc., is shown here after it has been completely enameled and assembled.

All porcelain hospital . . (Continued)

lain enamel, even though he personally approved of and believed in it, without first studying its performance in a number of Eastern construction jobs that had withstood climatic conditions harsher than California's. He finally decided it was the most practicable and economical material obtainable for hospital construction in the climate and setting of the projected institution. He considered it ideal and beautiful for his desired modern architectural effect. "It will be wonderfully easy to keep clean and free of dust and germs," he said.

Because of transportation difficulties, no one in San Francisco or Eastbay who is interested in the hospital has visited it during recent months, but it was in excellent condition when last seen. R. E. Williams, assistant to the vice president in charge of sales at Columbia Steel Company, says: "No one we have talked with has been to Grass Valley in the past year to look the job over but it is our opinion that the porcelain must be in first class condition as this has been the case with every other comparable job we have had experience with."

Considering that the job has had to be left in an uncompleted state, those interested in it believe it is very fortunate that porcelain enamel was chosen. If some less durable material had been employed, repair, renovation or refinishing might have been necessary before construction could be completed. As it is, construction can be started where the contractors left off. And a "neglected," unfinished porcelain enamel structure will have had an excellent opportunity to demonstrate the truth of some of the arguments in its favor that have been advanced by its proponents.

Repare

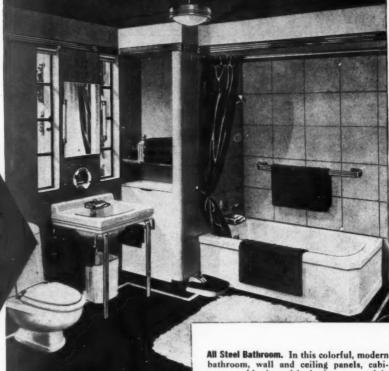
for this INCREASED DEMAND

THE people who will build, remodel or buy millions of postwar homes will demand bathrooms, kitchens, laundries, of colorful, durable, easily cleaned porcelain-enameled steel.

In retail stores, when it is again possible, many merchants will build new customer-appeal into store fronts, counters, cabinets and shelves, getting full value from the adaptability, the durable beauty and convenience of porcelain-enameled steel.

In factories, office buildings, hotels, restaurants, laboratories and hospitals, from lavatories to operating rooms, the war-proven versatility of high-grade porcelain-enameled steel makes its almost universal use a reasonable certainty.

New frits have been developed, greater range of both solid color and



All Steel Bathroom. In this colorful, modern bathroom, wall and ceiling panels, cabinets, washbasin and bathtub are porcelain enamel, fused on a base of U·S·S VITRENAMEL Sheets.

vari-colored designs have proved popular, adding their attractions to the more practical advantages. Yet the *permanence* of all this utility and beauty depends upon the use of a specially prepared metal base.

We have perfected sheets of special composition; we have developed a special surface treatment; we maintain rigid control, in the production of U·S·S VITRENAMEL Sheets, of the special processes that make them light and strong, that enable the finished products to withstand acids, rain and sleet, sun and frost, corrosion, abrasion and impact.

Their uniform metallurgical properties insure maximum ductility for drawing, forming and stamping. Their treated surface makes the frit practically part of the metal, so firm is the bond established in firing. Their built-in resistance to a wide range of deteriorating agents insures long life for all equipment in which they are used.

Can you doubt that postwar building means increased demand for porcelain-enameled steel? You can prepare for this business now. When you get in touch with our VITRENAMEL engineers, you are assured of authoritative information on present and future developments which affect the demand for base metal for enamel products. Write today, without obligation, for this technical service.

ONE AIM . . . VICTORY . . . BUY BONDSI

U·S·S VITRENAMEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, Pacific Coast Distributors United States Steel Export Company, New York



UNITED STATES STEEL

War conference of washer and ironer mfgs.

(Continued)

of the important standardization problems is test procedure for wearability. Committee members working on tests and standards include John Dyer, Easy Washing Machine Corp.; Frank Breckenridge, Westinghouse Electric & Mfg. Co.; Wallace Oliver, Bendix Home Appliance Corp.; Dave Hayes, General Electric Co.; and Nicholas Etton, Chamberlain Corporation.

Tests established by this committee are to be checked by at least two wellknown independent laboratories before they are recommended for adoption.

One feature of the meeting that would be of interest to prospective home builders, as well as to manufacturers of household appliances, which was presented by Earl R. Bridge, Norge Division, Borg-Warner Corp., Muskegon, Michigan, was plans shown for home laundries, with recommendations for their introduction to architects and builders. A variety of plans was projected from slides to show how the home laundry could be set up on a logical production basis regardless of its location in the home.

W. Homer Reeve, general sales manager, Easy Washing Machine Corp., Syracuse, N. Y., discussed methods for instruction labeling of washers and ironers.

The Association members were told by William Shaw, Chicago, public relations advisor to the Association, that they face a most critical period when he said, "You are coming fast into an era where each of you will have to exercise your particular talents to the utmost, and to avail yourself of every promotional power within your reach. All around you, industries are mustering their strength for a war of their own, a showdown on who's to get the consumer's dollar."

While in some instances, as in many of the appliance groups, there is a tendency to "ease up" in war contracts, the Washer and Ironer Meeting in Chicago did certainly leave the impression that any return to the manufacture of civilian goods

may be accomplished with less speed than has been indicated in newspaper comment, and will be dependent on the successful coordination of Government and industry plans for the best interests of the consuming public,

Pressed metal institute . . (Continued)

study new developments and materials, methods and markets, with special attention to the use of new ferro alloys and new "clad" materials.

To facilitate speedy action in connection with the activity related to postwar problems and planning Mr. O. L. Earl has been appointed Market Development Engineer. Mr. Earl has been loaned to the Institute by the Mullins Manufacturing Company until permanent arrangements for a Market Development Engineer can be made.

Mr. Earl is thoroughly familiar with the pressed metal industry and also with Government requirements and procedures. He has had wide practical experience in engineering, production and marketing in the automotive and pressed metal fields. As Industrial Specialist, he assisted in

securing the services of specialists and executives in connection with the activities of the Tank Automotive Center of the War Department in Detroit.

Under Mr. Earl's direction, an engineering and market development program will be undertaken by the Institute in the interests of further cooperation with the Government in redesigning of war material to stampings, and in locating available facilities and manpower in the pressed metal industry to facilitate production. He will also assist the industry in the important task of translating wartime production experience into wider use of stampings in postwar consumer goods.

The Cleveland office of the Institute is located at Room 829 Union Commerce Bldg., Cleveland 14, Ohio.

Post-crypts by a scribbler

who ain't workin'

by The Wrangler

Here I was about to get meself a job scribblin for this sheet when the Editor he 'lucidates to me as how maybe there won't be no sheet to scribble for. Guess maybe I'll get meself lined up to scribble a bit for the circus poster people where there ain't no paper shortage.

My stool pidguns dug up a tolerab'l bit of interusting info. since the "start of finish" that you maybe have seen to. A lot of people who ain't showed much interest in Enamels before this have quick-like turned over a new grass blade.

For instance, a certain ceramic book that averaged 'bout eleven percent editorial on enamels during '43 has sudden-like come to love the industry and have bumped the writin' content about enamels right smart. Wonder what the Glass and Pottry folks'l say to that.

Also heard a couple of big shot publishers who never more'n raised there eye-brows at our industry afore finish started now thinks maybe they could like to start a paper for so fine and deservin' a bunch.

If this sheet ain't done nothin' else it shure has woke up a bunch of fancy scribblers that there is a gang in the U.S.A. what goes by the moniker—"ENAMELERS."

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(HICAGO MILL AND LUMBER OMPANY

111 W. Washington Street

Chicago 2, Illinois

Formed metal plumbing ware . . (Continued)

sheet metal, porcelain enameled cast iron, stainless steel, aluminum, glazed earthenware and concrete.

The work done with earthenware indicates that a satisfactory white, heavily glazed surface can be produced that will take the necessary thermal shock and have no more than 3% water absorption.

It may come as a surprise to some to learn that there are at least five companies making concrete tubs. If you think of this in terms of your basement laundry tubs (most laundry tubs are now concrete) instead of your sidewalk, the possibility in this product may be gauged.

Stainless steel offers new possibilities when backed up with concrete on the job, and aluminum is said to be considering the market.

Housewives and architects continue to be interested in a white surface. Whiteness (light reflection) and cleanliness are most important. As far as standards are concerned Mr. Fairchild pointed to the fact that general policies on sizes, styles, etc., must be established before a commercial standard can be tackled.

Said Mr. Fairchild, "Standards and specifications are no cure-all. They can not be used 'blindfolded' as a sole basis for purchasing."

As ramifications enter the market it becomes more difficult for the buyer to judge, and standards and specifications become increasingly important. was to use more of these men in supervisory capacities. It is anticipated that after the war, men with technical training will rapidly assume executive responsibilities in the industry.

11. Raw Material for Porcelain Enamels, Survey of Current Markets and Allocations.

BY JOHN W. ILIFF: Harshaw Chemical Company, Cleveland, O.

Although many raw materials for porcelain enamel have been restricted, either by market shortages or by WPB regulations, all important raw materials except tin oxide are currently available in at least moderate quantity. A group of materials warranting individual attention is considered.

12. Uverite, Mill-Addition Opacifier for Porcelain Enamels.

BY C. J. HARBERT AND JOHN W. ILIFF: Harshaw Chemical Co., Cleveland, O.

Uverite is the trade name for an antimony-titranium opacifier, having an approximate formula of 7CaO·CaF₂·6TiO₂·2Sb₂O₃. When compared with tin oxide in a range of commercial enamels, Uverite proves to be equivalent in its effect on opacity, color, gloss, firing range, general workability, and durability.

13.

By W. G. MARTIN: A. O. Smith Corp., Milwaukee, Wis.

14. Tests for Hot-Water Resistance of Tank Enamels.

By W. N. HARRISON AND D. G. MOORE: National Bureau of Standards, Washington, D.C.

The resistance of a representative group of commercial tank enamels and of several nontank enamels to attack by hot water was measured by loss of thickness and loss of gloss, respectively. The specimens were treated in a conventional autoclave, in a modified autoclave and in other special apparatus. The tests are described in detail, and the application of the data to porcelain enameled hot-water tanks in actual service is discussed.

15. Effect of Ground-Coat Enamels on Reflectance of Cover-Coat Enamels.

By P. C. Stufft: Pemco Corp., Baltimore, Md.

The effect of various types of ground coat on the reflectivity of opaque and superopaque cover-coat enamels was determined.

16. Use of Potassium Dichromate Method in Determining Iron Content of Pickle Acids.

By E. G. Porst: Pemco Corporation, Baltimore, Md.

Developments in the field of indicators has made possible the use of potassium dichromate with the elimination of many of the difficulties previously encountered when potassium permanganate was used. A description of the method and a discussion of results are given.

 Panel Discussion of Questions Submitted by Men in Industry.

Introducing de-ionized water for war plants . .

(Continued)

preparing pure water. The acid adsorption resins are already being used commercially in the industrial process of de-acidification of formaldehyde and that the cationic resin has been proven on full commercial scale in the removal of cations in polyhydric alcohol and in the purification of sugar juices. The latter development may revolutionize the entire industrial sugar refinery process. The exchangers were called upon to extract tartrates from wine and wine slops and this was successfully carried out in a large winery in California.

There are a number of special

problems which the research chemist can undertake with these remarkable new chemical tools. In some of the special cases, we do not wish to imply that the problems are completely solved. Each special application of the resins is exploratory and the sketchy results presented are merely indicative of what may be investigated. A variety of resinous materials offers many interesting avenues of approach to the solution of the problems which have prevailed in the past, and it is our sincere desire that you will continue investigating them in your own field of endeavor, that of porcelain enameling.

American Ceramic Society's second war council enamel division program—46th annual meeting

(Continued)

Two series of enameled utensils were tested for impact using the E.M.U.C. standard impact test. The ware tested in each group had the same metal thickness and enamel thickness, but the bottom radius varied. From the results, ifpact resistance was found to increase with the increase in bottom radius.

Symposium on Tests.
 Chairman, R. L. Cook: Dept. of Ceramic Engineering, University of Illinois, Urbana, Ill.

Wednesday April 5 — Parlors B & C

9.

BY E. E. BRYANT: Ferro Enamel Corp., Cleveland, Ohio.

10. The Ceramic Engineer in Porcelain Enameling Plants.

By Charles S. Pearce: Porcelain Enamel Institute, Washington, D.C.

Until recently, few ceramic engineers have been used in control of operations. The trend immediately preceding the war



MEN LIKE EM HOT!

Yes, sir, matey — you can't satisfy a fightin' man with a sandwich or a piece of cake. Men like hot meals, even in the tropics. And the way we get 'em hot is over a good old TK heating unit.

The folks that make these heating units sure do a swell job. We use them on all types of naval craft — PT boats, LST's and all the rest of the alphabet. With them we prepare meals in a jiffy and

because the TK unit is easy to clean, the skipper never can beef about our gear not being spotless.

On the home front TK replacement units are available *now*. Send in your orders with an equal number of burned out units or a statement that you have contributed a like number to regular scrap outlets.

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The finish line . . editorial . . (Continued)

It is possible for a multiple publisher of magazines to start a new publication by shifting of quotas, but this does not provide for a new publication by a new publisher. Testimony indicated it is also possible to start a new newspaper if the total tonnage used does not exceed 25 tons per quarter. (Over eight times the requirements for FINISH.)

The final answer

The answer as to whether the first two issues of FINISII will be the *start* or the "finis" is now up to the final decision of the Appeals Board. While there are certainly points in the order themselves that would bear questioning from a common sense angle, the stand of the Administrator and Appeals Committee can be understood when we consider that paper is a critical material, and that it is their job to administer and uphold the Orders as written. The power to grant relief from the Order rests entirely with the Appeals Board.

We had what we consider a fair hearing before this Board (overtime was allowed), and judging from our impression of the type of men represented by its membership, there is little doubt that their final decision will be what they consider an equitable handling of the case based on the evidence offered.

An illusive ball

In our first editorial we said, "The ball has been passed to us, and we shall spare no effort in taking it over for a touchdown in the interests of the porcelain enameling and ceramic finishing industry."

At this point we are back of our own goal line, but we will say this, If there is any way possible to furnish this industry with "a publication" that is both within the law and the rulings of W.P.B. we expect to do so, looking to the time when we can again offer you a publication of the type established with our January 1944 issue.



Advertisers' Index for February-March, 1944, Finish

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Give these advertisers credit for "sticking with the ship" in spite of the inconvenience caused by the "paper situation." All advertisers were notifed immediately of the WPB "stop order," and not one full schedule contract advertiser has dropped out of Finish. Some January advertisers are not in this issue—they had contracted for one issue only. You would find many new advertisers in this issue but for the fact we could not honestly solicit for a publication that might not continue.